Rcvd: 3/28/14

DEPARTMENT OF THE ARMY
HEADQUARTERS, 88TH REGIONAL SUPPORT COMMAND
60 SOUTH O STREET
FORT MCCOY, WISCONSIN 54656

REPLY TO
ATTENTION OF

March 24, 2014

The following Attachments are available only on CD
Attachment 1

Directorate of Public Works

[redacted]

[redacted]

We wanted to take this opportunity to thank you for your assistance in allowing us to collect samples at your home and update you on our ongoing investigation into potential contamination for the former Hanley Area of the St. Louis Ordnance Plant. It is our intent to keep you informed as we continue our work to determine the extent of any environmental impacts related to that facility.

As you know, in January 2014, a contractor for the 88th Regional Support Command (RSC) collected environmental samples at your residence. We are enclosing a report summarizing the sampling effort for your information.

The sampling was completed to assess whether contamination is affecting local residents' indoor air quality through a process called vapor intrusion. Vapor intrusion occurs when vapors from volatile chemicals in groundwater or subsurface soil move through the soil and enter nearby buildings.

Samples of indoor and outdoor air, along with soil vapors from beneath the basement floor slab were collected from your residence to assess whether vapor intrusion may be of concern. Samples were analyzed for chemicals known as volatile organic compounds (VOCs). Those are the contaminants from the former Hanley Area that could potentially result in vapor intrusion.

VOC concentrations detected in the samples were compared to levels developed using U.S. Environmental Protection Agency (EPA) methods. EPA has determined that these levels are protective of individuals who may be exposed to these chemicals through inhalation. Screening levels are very conservative and are usually several times lower than the final permissible levels.

As noted in the enclosed report, several VOC concentrations in indoor air exceeded the screening levels. These exceeding concentrations were compared against concentrations of the same chemicals in outdoor air, subslab soil gas, and groundwater to help determine if vapor intrusion was the source of the measured indoor air concentrations or if they were from other sources, such as indoor household products (cleaning supplies) and outdoor chemical sources (automobile and bus emissions).

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The enclosed report assesses possible sources of each indoor air chemical measured above the screening level. It also compares January 2014 results with those from sampling performed in February 2012 and in 2008 to analyze if and how the chemical concentrations are changing over time. The January 2014 results suggest indoor and outdoor sources are contributing to residential indoor air quality. It also is possible that trichloroethene in subslab soil gas may be related to the former Hanley area, but does not appear to be affecting indoor air quality.

Based on results from the sampling events, the 88th RSC would like to collect two more rounds of samples from your residence. Results from the follow-on sampling would be used to further assess the contribution of indoor chemical sources and vapor intrusion to the indoor air quality of the residence, and to better understand whether vapor intrusion from the former Hanley Area is the source of chemical concentrations measured inside the residence. If you grant us permission to perform the follow-on work, we will provide a report on the sampling results for your review.

The Army will also keep you informed of the vapor intrusion investigation being conducted at the former Hanley Area and along Stratford Avenue. Results from that investigation, along with the sampling the Army wishes to perform in your residence, will help the Army determine if there is a link between the former Hanley Area and chemical concentrations at the residence. If a connection is found, the Army will take appropriate corrective measures to address the vapor intrusion pathway, at no cost to you.

We appreciate your cooperation and patience through the sampling process. We will contact you by phone in the coming days to ask for your permission to perform the follow-on work and answer questions you may have about that work or the information provided in the enclosed report. In the meantime, if you have any questions, please feel free to call contact Mr. Barry McFarland at (316) 681-1759, extension 1419, or Ms. Josephine Newton-Lund at (816) 389-3912, or by email at barry.l.mcfarland2.ctr@mail.mil or Josephine.M.Newton-lund@usace.army.mil.

Sincerely,

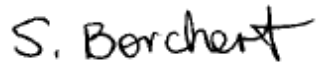
For David L. Moore
Chief, Public Works- Environmental Division

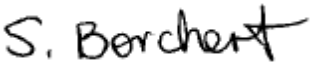
STATEMENT OF TECHNICAL REVIEW

Remedial Investigation/Feasibility Study Activities for Operable Unit 2 (Vapor Intrusion Pathway) at the St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

January 2014 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri

The CH2M HILL team has completed the technical review of the submittal described above. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, using justified and valid assumptions, was verified, including review of assumptions; methods, procedures, and material used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with the law and existing U.S. Army Corps of Engineers policy.

Technical Reviewer	Signature	Date of Review
Susanne Borchert		03/19/14
Loren Lund		03/19/2014

Quality Control System Manager or Project Manager		Independent Technical Review Leader
Anthony Swierczek		Susanne Borchert
Signature	Date	Signature
	03/21/2014	

January 2014 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri

PREPARED FOR: U.S. Army Corps of Engineers–Kansas City District

PREPARED BY: CH2M HILL

DATE: March 24, 2014

This memorandum presents the objectives, methods, and findings of the follow-on vapor intrusion (VI) assessment performed at Private Property 2 (PP-2) in St. Louis on January 13 and 14, 2014. The assessment consisted of groundwater sampling between December 16 and 19, 2013 and subslab soil gas, indoor air, and ambient (outdoor) air sampling between January 13 and 14, 2014 in accordance with the *Final Uniform Federal Policy—Quality Assurance Project Plan, RI/FS Activities for Operable Unit 2 (Vapor Intrusion Pathway), St. Louis Ordnance Plant, Former Hanley Area, St. Louis Missouri* (referred to herein as Operable Unit 2 [OU-2] RI work plan; CH2M HILL 2013)

The work described in this memorandum was the first round of VI assessments performed under the OU-2 RI work plan at PP-2. Three previous rounds of VI assessments that took place in March 2008, May 2008, and February 2012 are discussed in the following technical memorandums:

- *Vapor Intrusion Assessment St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri, St. Louis, Missouri* (CH2M HILL 2009a).
- *February 2012 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri* (CH2M HILL 2012).

The work was performed as part of the Defense Environmental Restoration Program under Contract Number W912DQ-11-D-3005, Task Order Number 0009.

1. Introduction

The U.S. Army selected a preferred alternative for addressing contamination at the St. Louis Ordnance Plant, former Hanley Area (Figure 1), in consultation with the Missouri Department of Natural Resources (MDNR) and U.S. Environmental Protection Agency (USEPA), Region 7, and with input from the public. The preferred alternative was presented in a proposed plan (CH2M HILL 2010a) submitted for public comment in November 2010.

The project stakeholders agreed to divide the former Hanley Area into two OUs during development of the decision document:

- OU-1: Actions Addressing Contaminated Soil, Powder Well Sediment, and Groundwater Concerns
- OU-2: Actions Addressing the VI Pathway

The decision document for OU-1 was finalized, signed by the Army Environmental Command, and endorsed by MDNR and USEPA in September 2011 (CH2M HILL 2011). The U.S. Army performed a remedial action at OU-1 in 2012 that consisted of onsite groundwater treatment and offsite disposal of excavated soil and powder well sediment to address potential human health risks identified in the remedial investigation (RI) report (CH2M HILL 2009b). Several VI assessments were performed during the OU-1 remedial action at various residences north of Stratford Avenue based on volatile organic compound (VOC) concentrations in groundwater, the proximity to the former Hanley Area, and previous VI assessment findings at adjacent properties. Figure 2 shows the August 2010 VOC concentrations in groundwater that exceeded screening levels (e.g., drinking water standards or risk-based standards for potable water use) and prompted the VI assessments. The lines of evidence from these VI assessments indicated there is no conclusive link between the former Hanley Area groundwater contaminants and vapor intrusion into indoor air.

However, additional VI pathway investigations were requested because of the offsite groundwater impacts and the potential for site-related contaminant migration, and are discussed further in the OU-2 RI work plan

(CH2M HILL 2013). A phased approach, or "follow-the-evidence" approach is being performed during the OU-2 RI. The first phase of the RI is designed to assess shallow groundwater conditions (i.e., groundwater at the water table) near the residences immediately downgradient of the former Hanley Area. From a VI perspective, shallow groundwater VOC concentrations at the water table are of interest because this water-to-air interface is where volatilization of chemicals from groundwater first occurs. VOC concentrations in shallow groundwater are compared against conservative risk-based VI screening levels ([VISLs]; discussed in further detail in Section 5.3). Vapor intrusion investigations are being conducted at residences located within 100 feet of shallow groundwater VOC concentrations above VISLs. Various residences north of Stratford Avenue were selected during the OU-2 work planning phase based on groundwater concentrations observed in August 2010, before shallow monitoring wells were installed in 2013 as part of the OU-2 RI.

As noted, the OU-2 VI assessments include assessing shallow groundwater conditions near residences and collecting subslab soil gas, indoor air, and ambient (outdoor) air samples to assess the potential for site-related contaminant migration into offsite residences.

2. Previous VI Assessments at PP-2

A VI assessment was conducted at PP-2 in 2008 that consisted of collecting two groundwater grab samples in March and indoor and outdoor air samples in March and May. Exterior soil gas sampling was attempted in March 2008, but could not be collected because of the tight, expansive nature of the clay soil. Indoor air samples were collected from the northeast and southwest corners of the basement. The residence was vacant at the time of the 2008 sampling effort. Results from the 2008 sampling effort are presented in the November 2009 technical memorandum (contained in Appendix B of the RI report), *Vapor Intrusion Assessment, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri* (CH2M HILL 2009a).

The groundwater grab samples, indoor air samples (collected near the northeast and southwest corners of the residence), and outdoor air samples collected in March and May 2008 were analyzed for VOCs, and results were compared against risk-based screening levels. Chemical concentrations in the groundwater grab samples were measured below their respective screening levels. Trichloroethene (TCE) was detected above the acceptable risk level of 1 microgram per cubic meter ($\mu g/m^3$) in the indoor air sample collected at the southwest corner of the residence in March 2008 (1.1 $\mu g/m^3$); however, subslab soil gas samples were not collected during this sampling event to determine if indoor air quality was due to VI. The indoor air concentration in the sample collected near the northeast corner of the residence was about 3-times less (0.41 $\mu g/m^3$) on that same date. Based on the one indoor air sample where the concentration of TCE was observed slightly exceeding the acceptable risk level, a second round of indoor and outdoor air sampling was collected in May 2008 as part of the remedial investigation field activities. TCE in indoor air was measured at a concentration below the acceptable risk level. It was concluded that the VI pathway was incomplete or insignificant based on the results of the 2008 VI assessment.

The VOC analyte list was expanded for the February 2012 VI assessment at PP-2 based on chemicals that exceeded screening levels in groundwater during the 2008 RI and also in August 2010. The 2012 VI assessment consisted of subslab soil gas, indoor air, and outdoor air samples as presented in the technical memorandum, *February 2012 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri* (CH2M HILL 2012). Several chemical concentrations were measured at PP-2 at concentrations above screening levels in indoor air and subslab soil gas. Indoor air concentrations measured in 2012 generally were comparable to those measured in 2008, with many chemicals having background sources such as household products or outdoor chemical releases such as automobile exhaust that likely contributed to the indoor air concentrations.

TCE detected above the screening level in the subslab soil gas in February 2012 may be associated with the former Hanley Area, but VI of TCE from subslab soil gas does not appear to contribute significantly to indoor air quality based on the low TCE concentrations measured in indoor air (below its screening level). Additional investigation of the VI pathway at PP-2 was recommended and incorporated into the OU-2 RI work plan developed by the U.S. Army with input from MDNR and USEPA.

3. Objective

The primary objective at OU-2 is to evaluate the VI pathway and implement appropriate remedial actions, if necessary, to protect human health and the environment. The following objectives were developed and presented in the OU-2 RI work plan with input from MDNR and USEPA:

- Determine whether VI of site-related VOCs is occurring and is significant at offsite residences.
- Determine whether VI of site-related VOCs could occur to a significant extent in the future at offsite residences.
- Maintain proactive communication and responsiveness to the public throughout the OU-2 RI/feasibility study (FS).
- Obtain sufficient RI data to develop remedial alternatives during the FS (if needed).
- Develop a decision matrix that includes both short- and long-term response actions.

The OU-2 RI is assessing the VI pathway at select offsite residences north of the former Hanley Area in order to achieve these objectives.

5. Methods

5.1 Building Survey

CH2M HILL performed a building survey on January 13, 2014, before conducting subslab soil gas, indoor air, and outdoor air sampling. The survey included a chemical inventory and an interview with the resident. Several areas of standing water were noted in the basement during the February 2012 VI assessment. Water was observed seeping through a floor/wall joint in the southeastern storage room and in the smaller storage room along the south wall. Cracks in the southern wall appeared to be the source of the standing water. The homeowner noted that rainwater accumulates under the front (southern) porch during heavy storms and seeps into the basement through the wall cracks. Evidence of mold was observed around the cracks in the south wall. Standing water was not observed in the basement during the January 2014 VI assessment. The basement does not have a sump.

Attachment 1 contains a copy of the completed building inspection form. Attachment 2 contains photographs of the sampling setup and canister placements.

5.2 Subslab Soil Gas Sampling

Subslab soil gas sampling activities began on January 13, 2014. The sample locations were identical to those used in February 2012: immediately north of the bottom of the steps leading to the basement (SG-01), and 10 feet east of the west exterior wall and 15 feet south of the north exterior wall (SG-02) (Figure 3). The semi-permanent subslab soil gas probes installed in the floor during the February 2012 VI assessment were used during the January

2014 assessment. As noted in the *February 2012 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri,* the concrete slab is about 3 inches thick at both locations.

The subslab soil gas sample probes installed in the basement at PP-2 were purged, and 6-liter SUMMA canisters were deployed for 24-hour sample collection on January 13, 2014. The integrity of the seals were visually inspected for signs of cracks and shrinkage before the subslab sample locations were purged. No visible defect in the seals were noted. The floor drains were inspected to confirm the presence of water; distilled water was poured into the floor drains to fill the traps.

A total VOC reading was collected at the floor drains using a calibrated photoionization detector equipped with a 10.6 electron-volt lamp, as was an indoor air total VOC reading in the HVAC room. Total VOCs were not detected with the photoionization detector at the floor drains and in the HVAC room.

The sampling equipment was checked for leaks before purging and sampling activities. Leak check procedures were performed in accordance with the standard operating procedure (SOP) provided in the OU-2 RI work plan. The system maintained a consistent vacuum during the leak check, meaning the sampling equipment was airtight and not susceptible to outside interference during purging.

Subslab soil gas probes were also checked for leaks during purging and following the successful system leak check. Leak check procedures were performed in accordance with the SOP in the OU-2 RI work plan. The leak check was performed using 100 percent helium gas as a tracer to determine whether indoor air was infiltrating into the subslab sample probe during purging. Helium was released into an enclosure over the soil gas probes. At least 2 liters of subslab soil gas were purged into a 3-liter Tedlar bag during the leak check. Once the bag was filled, a helium leak detector was used to sample the bag for helium. No helium was detected within the purged subslab soil gas, demonstrating that the integrity of the soil gas probes and seals was not compromised.

A calibrated photoionization detector equipped with a 10.6 electron-volt lamp was used to sample the Tedlar bag containing the purged vapor for total VOCs. VOCs were not detected in the Tedlar bags containing vapor from sample locations SG-01 and SG-02.

Individually certified 6-liter SUMMA canisters were used to collect the subslab soil gas samples at SG-01 and SG-02. The initial canister vacuums were recorded using a standard pressure gauge installed on the canisters before they were deployed for subslab soil gas sample collection. The canisters were opened on January 13 and remained open for roughly 24 hours. A flow controller set for 3.75 milliliters per minute allowed the canisters to fill over a period of roughly 24 hours.

CH2M HILL returned to the residence on January 14 and closed the sample ports on the subslab soil gas canisters. The arrival time was within 24 hours of opening the canisters to ensure that they had not reached atmospheric pressure before closing the valves. Attachment 2 provides photographs of the sampling setup and canister placements. Table 1 provides sampling details including canister vacuums measured before and after sampling.

5.3 Indoor Air and Outdoor Air Sampling

The active canisters for indoor and outdoor air sampling were deployed on January 13, 2014. A 6-liter, individually certified SUMMA canister was placed on small chest freezer centrally located in the basement (Figure 3) and opened to collect an indoor air sample. The intake was roughly 3 feet above the floor. For quality assurance purposes, a field duplicate canister was connected to the parent indoor air sample by a T-connection and deployed at the same time as the parent canister. The outdoor air sample canister was deployed outside the residence on the front porch (Figure 3). The initial canister vacuums were recorded using a standard pressure gauge installed on the canisters before they were deployed for indoor air and outdoor sample collection. The canisters were kept open for 24 hours using a flow controller set for 3.75 milliliters per minute, which allowed the canisters to fill over a 24-hour period.

The sampling team returned to the residence on January 14, 2014 and closed the sample ports on the indoor air and outdoor air canisters. The team arrived at the residence within 24 hours of opening the canisters to ensure that they had not reached atmospheric pressure before closing the valves. Attachment 2 contains photographs of the sampling setup and canister placements. Table 1 summarizes sampling details, including canister vacuums measured before and after sampling.

5.4 Groundwater Sampling

Shallow monitoring wells MW-107S, MW-108S, and MW-109S, located near PP-2, were purged and sampled on December 17 and 18, 2013 for VOC analysis, in accordance with the SOPs for groundwater low-flow purging and sampling presented in the OU-2 RI work plan. The December 2013 groundwater sampling event consisted of collecting groundwater samples at all the existing monitoring wells to assess groundwater conditions. For the purpose of the VI assessment at PP-2, shallow groundwater samples collection within 100 feet of the residence are appropriate for assessing groundwater conditions at the top of the water table. Quality assurance/quality control samples (such as field duplicates, matrix spike/matrix spike duplicates) were collected at other monitoring wells during the groundwater sampling event. Monitoring wells were purged using a peristaltic pump with disposable tubing. Attachment 3 presents the groundwater quality parameters collected during purging. Groundwater investigation-derived waste was transferred into a 55-gallon drum (approved by the U.S. Department of Transportation) at the former Hanley Area for characterization and subsequent disposal.

5.5 Laboratory Analyses

The groundwater samples collected at MW-107S, MW-108S, and MW-109S were analyzed for VOCs using method SW 846 8260B. Sample containers were shipped to Empirical Laboratories in Nashville, Tennessee, for analysis of the following VOCs specified in the OU-2 RI work plan:

- Benzene
- Carbon tetrachloride
- Chloroform
- Naphthalene
- Methylene chloride
- 1,2-Dichloroethane (1,2-DCA)
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- trans-1,2-Dichloroethene (trans-1,2-DCE)
- Vinyl chloride
- 1,1,1,2-tetrachloroethane (1,1,1,2-TeCA)
- 1,1,2,2-tetrachloroethane (1,1,2,2-TeCA)
- 1,1,2-trichloroethane (1,1,2-TCA)
- Tetrachloroethene (PCE)
- TCE

Subslab soil gas, indoor air, and outdoor air samples were analyzed for VOCs by method TO-15, Selective Ion Mode. The VOC reporting list consists of the compounds listed above except for 1,1,1,2-TeCA, which is not reported in the TO-15 analyte list. As discussed in the work plan, the omission of 1,1,1,2-TeCA in the reporting list is not considered a data gap, because the chemical has not been detected in any offsite groundwater samples. The detectable presence of 1,1,1,2-TeCA is limited only to MW-111, which is within the site boundaries of the former Hanley Area (Figure 2). The air canisters were shipped to Applied Science Laboratories in Corvallis, Oregon, for analysis.

The vacuum in each canister was measured using a standard vacuum gauge before and after sampling to verify that a sufficient sample volume was collected for laboratory analysis. Once the laboratory received the canisters, the vacuum in each canister was measured before analysis. As shown in Table 1, slightly different canister vacuums were measured in the field after sampling and at the laboratory before analysis. The laboratory measurements are considered more accurate, based on the quality of the fixed-based laboratory versus field pressure gauges. The differences between the field and laboratory measurements in Table 1 are small, indicating that the field pressure gauges were sufficiently representative. Sample leakage during transit does not appear to have occurred, based on the initial and final pressure measurements. Sufficient sample volume considered to be representative of the 24-hour sample period was present in each canister.

6. Findings

6.1 Chemical Inventory

A chemical inventory was conducted during the January 2014 VI assessment to record the amounts and types of chemicals stored within the residence. This information was collected to identify possible indoor sources of VOCs.

The quantity of chemicals observed in January 2014 in the basement at PP-2 has not changed significantly since the February 2012 inspection and VI assessment and was verified by referencing the February 2012 inventory sheet. Chemicals observed in the basement included laundry detergent, bleach, wood finish, various caulks and glues, propylene and acetylene cylinders, paint, a pallet of asphalt shingles, and weed killer. Gas-powered

equipment included a chainsaw. Table 2 presents the chemical inventory recorded in January 2014. Attachment 1 contains a copy of the completed building inspection form.

Although VI guidance documents (USEPA 2002 and 2013, Interstate Technology & Regulatory Council 2007, Department of Defense 2009, and USEPA Draft VI Guidance 2013) state that known background indoor VOC sources should be removed at least 24 hours before sampling, it was not possible to do this for practical reasons. Removing all known or potential background indoor air sources of VOCs before sampling helps to minimize background contributions, but often it is not feasible or possible.

6.2 Other Field Observations

The weather was 49°F, cloudy, with more than 12 inches of snow on the ground, when the canisters were deployed on January 13. Barometric pressure was recorded at 29.63 inches of mercury and falling that day. On January 14, when the canisters were retrieved, the weather was 39°F, cloudy, with more than 12 inches of snow on the ground. Barometric pressure that day was recorded at 29.78 inches of mercury and steady. The heating system at PP-2 was operating during deployment of the subslab soil gas probes and indoor air canisters.

6.3 Analytical Results

The screening criteria for groundwater, subslab soil gas, and indoor air presented in the OU-2 RI work plan are discussed below.

- **Groundwater**—In March 2012, USEPA released a VISL calculator that provides conservative default VISLs. The VISLs (November 2013 update) for groundwater were used and based on residential use, an attenuation factor of 0.001 for groundwater-to-indoor air, an excess lifetime cancer risk (ELCR) of 1×10^{-6}, and/or a noncancer hazard quotient (HQ) of 1.0.
- **Indoor and Outdoor Air**—The target indoor air concentrations provided in the VISL calculator were used and based on the ELCR and HQ identified above. Outdoor air data were used for comparison with indoor air concentrations to determine if the measured indoor air concentrations are associated with outdoor air infiltration.
- **Subslab Soil Gas**—The target subslab and exterior soil gas concentrations provided in the VISL calculator were used and based on the ELCR and HQ identified above. The target subslab soil gas is the target indoor air concentration divided by the USEPA generic attenuation factor for soil gas (default value = 0.1).

Table 3 presents the December 2013 groundwater sampling results from shallow monitoring wells MW-107S, MW-108S, and MW-109S. Figure 4 lists VOCs detected above the VISLs in groundwater at MW-107S, MW-108S, and MW-109S. Table 4 presents the indoor air, outdoor air, and subslab soil gas concentrations measured at PP-2 in January 2014, and also results for March and May 2008, and February 2012.

Attachment 4 contains an assessment of data quality.

6.4 Screening Approach

Table 3 presents groundwater results from the December 2013 groundwater sampling event. TCE was detected at concentrations above the VISL at monitoring wells MW-107S (4.9 micrograms per liter [µg/L]) and MW-108S (29.4 µg/L).

As shown in Table 4, 1,1,2,2-TeCA, chloroform, naphthalene, and TCE were detected at concentrations above VISLs in subslab soil gas in January 2014. Benzene, chloroform, and naphthalene were detected at concentrations above the VISLs in indoor air.

To assess the possible relationship between subslab soil gas and indoor air concentrations, the following lines of evidence were considered:

- Comparison of chemical concentrations in subslab soil gas and indoor air
- Comparison of chemical concentrations in indoor air and outdoor air
- Evaluation of chemical sources identified inside the home
- Evaluation of chemicals detected in groundwater

Using the lines of evidence described above, each exceeding chemical was evaluated to assess its potential sources. The concentrations measured in March 2008, May 2008, and February 2012 were compared against those measured in January 2014 to assess temporal changes.

1,1,2,2-TeCa. 1,1,2,2-TeCA was measured at an indoor air concentration of 4.1 µg/m^3 at subslab soil gas sample SG-02, exceeding the screening level of 0.42 µg/m^3. This chemical was detected below the VISL in February 2012 at this location and has not been detected in indoor and outdoor air. 1,1,2,2-TeCA was not detected in shallow groundwater at monitoring wells MW-107S, MW-108S, and MW-109S (Figure 4).

1,1,2,2-TeCA was not analyzed for in the air samples in March and May 2008.

The presence of 1,1,2,2-TeCA in subslab soil gas does not appear to be site-related because this chemical was not detected in shallow groundwater. During completion of the chemical inventory (Table 2), one 6-liter canister of DuPont™ R-22 Freon was observed in the basement. A second 6-liter Freon canister was also observed in the basement; however, the type of refrigerant was not recorded. 1,1,2,2-TeCA is used as a refrigerant known as R-130 or Freon 130, and if small amounts of refrigerant in the air conditioning system is being released inside the home, then it may be the source of the 1,1,2,2-TeCA inside the residence. Subslab soil gas does not appear to be significantly affecting indoor air quality, based on its absence in indoor air.

Benzene. Benzene was measured at an indoor air concentration of 1.1 µg/m^3, exceeding the screening level of 0.31 µg/m^3. However, the outdoor air concentration was measured at a similar concentration of 1.1 µg/m^3 when compared with the indoor air concentration. Similar indoor and outdoor concentrations were observed in February 2012. Benzene was measured at concentrations below the VISL at both subslab soil gas sample locations. Benzene was not detected in groundwater at monitoring wells MW-107S, MW-108S, and MW-109S (Figure 4).

Benzene was not analyzed for in the air samples in March and May 2008.

The presence of benzene at similar concentrations in indoor and outdoor air in 2012 and 2014 indicates that benzene is originating from an outdoor chemical source.

Chloroform. Similar to the February 2012 results, chloroform was measured at an indoor air concentration of 0.27 µg/m^3, slightly exceeding its screening level of 0.11 µg/m^3. Chloroform was measured at a similar concentration of 0.18 µg/m^3 in outdoor air. Chloroform was measured above the VISL of 1.1 µg/m^3 at an estimated concentration of 8.5 µg/m^3 in subslab soil gas sample SG-01. It was also detected slightly above the VISL in sample SG-02 at 1.4 µg/m^3. The difference in subslab concentrations between SG-01 and SG-02 likely is due to inherent spatial. Factors that could affect subslab spatial variability include lithology, building characteristics, meteorological conditions, VOC release characteristics, and potential preferential migration pathways.

Chloroform was either measured at concentrations below the VISL or not detected in shallow groundwater at nearby monitoring wells MW-107S, MW-108S, and MW-109S in December 2013 (Figure 4).

Chloroform was not analyzed in air samples in March and May 2008.

In 2014, the concentration of chloroform in indoor air was similar to the outdoor air concentration (less than two times), indicating that outdoor air as the likely source of the measured indoor air concentrations. Although subslab soil gas concentrations exceeded the VISL, the observation that the measured indoor concentrations were likely due to outdoor air infiltration indicates the default VISL is overly conservative and overestimates VI potential. The lack of shallow groundwater detections at MW-108S and MW-109S and the low estimated concentration detected at MW-107S suggest the former Hanley Area is not likely the source. Chloroform is a common background VOC in municipally treated water and household products (Agency for Toxic Substances & Disease Registry 1997).

Naphthalene. Naphthalene was measured at an indoor air concentration of 0.2 µg/m^3, slightly exceeding the VISL of 0.072 µg/m^3. The indoor air field duplicate sample yielded a naphthalene concentration of 0.63 µg/m^3 (estimated), higher than the concentration in the normal sample. The variability is similar to that observed in February 2012, but the cause is unknown. This magnitude of variability is expected and is commonly observed by

others (e.g., analysis conducted by Folkes et al. [2009] for indoor air data collected up to more than a decade at the Redfield, CO, and Endicott, NY, legacy VI sites). The uncertainties associated with the differences between the normal and field duplicate samples do not change the conclusions about VI, since all results were compared with screening levels and considered in the multiple lines of evidence evaluation. Naphthalene was not detected in the outdoor air sample. It was detected below the VISL in subslab soil gas sample SG-01 at 0.24 µg/m^3 (estimated) and not detected in subslab soil gas sample SG-02. Naphthalene was not detected in shallow groundwater at nearby monitoring wells MW-107S, MW-108S, and MW-109S (Figure 4).

Naphthalene was not analyzed for in air samples in March and May 2008.

Although the 2014 indoor air concentration was above the VISL, the low subslab soil gas concentration and the lack of detections in groundwater provide evidence of an indoor source. Naphthalene is found in many types of household cleaners and paints, such as those observed in the residence (Table 2).

Trichloroethene. TCE was measured at a subslab soil gas concentration of 19.2 µg/m^3, above its VISL of 4.3 µg/m^3 in subslab soil gas sample SG-01. TCE was detected at a concentration below the VISL in subslab soil gas sample SG-02 in January 2014. It was not measured at concentrations above the VISL in the indoor and outdoor air samples. TCE was detected above the VISL in shallow groundwater at nearby monitoring wells MW-107S (4.9 µg/L) and at MW-108S (29.4 µg/L).

In indoor air, TCE was detected at 1.1 µg/m^3 in March 2008, but as noted above, it was not detected above its screening level in February 2012 and January 2014. Because TCE is a primary chemical of concern at the former Hanley Area, it is not possible to rule out that the site may have contributed to the subslab soil gas concentration measured in February 2012 and January 2014; however, subslab impacts less than 20 µg/m^3 are considered to be a relatively minor vapor source for VI. Additional sampling will be performed to further assess whether TCE in the subslab at PP-2 is site-related. The low TCE concentration measured in indoor air (below its screening level) in 2012 and 2014 indicates that VI is not likely significant and subslab concentrations are not contributing significantly to the measured indoor concentrations.

7. Recommended Next Steps

Several chemical concentrations were measured above VISLs in indoor air and subslab soil gas at PP-2 in January 2014. However, indoor air concentrations measured in 2014 generally were comparable to those measured in 2008 and in 2012 and for many of the chemicals, background chemical sources such as household products or outdoor chemical releases such as automobile exhaust are responsible for the indoor air concentrations that exceeded screening levels. Chloroform is a common background VOC in municipally treated water and household products.

Although not detected in shallow groundwater, multiple lines of evidence suggest that the 1,1,2,2-TeCA detected in subslab soil gas at concentrations above the VISL is not related to the former Hanley Area. However, additional data will be collected to confirm this conclusion. The subslab soil gas concentration does not appear to be contributing to indoor air quality, based on undetectable indoor air concentrations.

The presence of TCE in the subslab soil gas as a result of site-related impacts associated with the former Hanley Area cannot be ruled out at this time. However, the low TCE concentrations measured in indoor air (below its screening level) in May 2008, 2012, and 2014 provide relatively strong evidence that VI of TCE from subslab soil gas does not appear to be contributing significantly to indoor air quality. It is not known if the TCE concentration measured above the acceptable risk level in March 2008 was due to VI because subslab soil gas samples were not collected at that time. Additional investigation at PP-2 will ascertain whether contamination from the former Hanley Area may be contributing to the subslab TCE concentrations at PP-2. Two more rounds of VI assessments will be conducted to assess temporal variability, in accordance with the OU-2 RI work plan and consistent with USEPA (2013) VI guidance.

The Army will seek approval from the resident to perform the additional sampling.

8. References

Agency for Toxic Substances & Disease Registry. 1997. *Toxicological Profile for Chloroform.* September.

CH2M HILL. 2009a. *Vapor Intrusion Assessment St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri, St. Louis, Missouri.* November.

CH2M HILL. 2009b. *Final Remedial Investigation Report, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri.* November.

CH2M HILL. 2010a. *Proposed Plan, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri*. December.

CH2M HILL. 2010b. *Final Feasibility Study Report, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri.* July.

CH2M HILL. 2011. *Final Decision Document, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri.* July.

CH2M HILL. 2012. *February 2012 Vapor Intrusion Assessment at Private Property 2, St. Louis, Missouri.* May.

CH2M HILL. 2013. *Final Uniform Federal Policy—Quality Assurance Project Plan, RI/FS Activities for Operable Unit 2 (Vapor Intrusion Pathway), St. Louis Ordnance Plant, Former Hanley Area, St. Louis Missouri.* December.

Department of Defense. 2009. *Department of Defense Vapor Intrusion Handbook*. January.

Folkes, D., W. Wertz, J. Kurtz, J., and T. Kuehster. 2009. "Observed Spatial and Temporal Distributions of CVOCs at Colorado and New York Vapor Intrusion Sites." *Groundwater Monitoring & Remediation*, Vol. 29, No. 1, pp. 70–80.

Interstate Technology & Regulatory Council. 2007. *Vapor Intrusion Pathway: A Practical Guideline.* http://www.itrcweb.org/guidancedocument.asp?tid=49.

U.S. Environmental Protection Agency (USEPA). 2002. *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).* EPA530-D-02-004.

U.S. Environmental Protection Agency. 2012. *OSWER Vapor Intrusion Screening Level (VISL) Users Guide.*

U.S. Environmental Protection Agency. 2013. *OSWER Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air (External Review Draft)*. April.

Tables

TABLE 1

Indoor Air, Outdoor Air, and Subslab Soil Gas Sampling Details

Vapor Intrusion Assessment, Private Property PP-2, St. Louis, Missouri

Sample Location	Canister ID	Purge Start Date and Time	Purge End Date and Time	Sampling Start Date and Time	Sampling End Date and Time	Medium Sampled	Initial Canister Vacuum (inches Hg)	Purge Vacuum (inches Hg)	Final Canister Vacuum Measured in Field After Sampling (inches Hg)	Final Canister Vacuum Measured at Laboratory (inches Hg)
PP02-IA-01	6L2655A	not applicable	not applicable	1/13/2014 12:30	1/14/14 11:24	Indoor Air	-28	None	-6	-8.2
PP02-IA-01-FD	6L2635S	not applicable	not applicable	1/13/2014 12:31	1/14/14 11:25	Indoor Air	-30	None	-5	-5.2
PP02-AA-01	6L2717A	not applicable	not applicable	1/13/2014 12:37	1/14/14 11:19	Ambient Air	-29	None	-5	-5.1
PP02-SG-01	6L2709A	1/13/2014 11:38	1/13/2014 11:48	1/13/2014 12:25	1/14/14 11:26	Soil Gas	-29	0	-4	-4.3
PP02-SG-02	6L2556S	1/13/2014 12:07	1/13/2014 12:17	1/13/2014 12:33	1/14/14 11:25	Soil Gas	-30	0	-5	-2.8

Analysis by TO-15 selective ion mode

inches Hg - inches of mercury

TABLE 2

Chemical Inventory

Vapor Intrusion Assessment, Private Property PP-2, St. Louis, Missouri

Household Name	Amount (Number and Size of Containers)	Chemical Present	Location
Minwax Wood Finish	One 8 oz.		Basement
Minwax Polyurethane	One 1 qt.		Basement
Clorox Bleach	One 64 oz.		Basement
Valu Time Bleach	One 1 gal.		Basement
Simple Green	One 1 gal.		Basement
Rectorseal No. 5 Pipe Thread Compound	One 12 oz.	diacetone alcohol	Basement
Downy Fabric Softener	21 0.85 oz.	chloroform	Basement
ALL Liquid Detergent	One 150 oz.	chloroform	Basement
Snuggle Liquid Detergent	One 150 oz.	chloroform	Basement
Roundup Weed Killer	One 1 gal.		Basement
DAP Alex Plus Acrylic Latex Caulk Plus Silicone	Two 10.1 oz.		Basement
Red Devil Universal Brand Caulk	One 5.5 oz.		Basement
GE Silicone II Window and Door Sealant	One 10.1 oz.		Basement
Gas-powered chainsaw	--	Not known if it contains gasoline	Basement
WD-40	One 8 oz.		Basement
Glidden Exterior Paint	Two 1 gal.		Basement
Glidden Exterior Paint	Two 1 gal.	di-ehtylene glycol	Basement
Windex	Two 1 gal.	ethylene	Basement
Roof Shingles	One pallet	Asphalt; polynuclear aromatic compounds	Basement
Acetylene Cylinder	One small	acetylene	Basement
Propylene Cylinder	One 16.92 oz.	propylene	Basement
DuPont Freon Canister	Two 6 L	chlorofluorocarbon	Basement

TABLE 3

Chemicals Detected in Groundwater at MW-107S, MW-108S, and MW-109S

Vapor Intrusion Assessment, Private Property PP-2, St. Louis, Missouri

Analyte	Location>> Sample Date>> Screening Level[1]	MW-107S 12/17/2013	MW-108S 12/18/2013	MW-109S 12/18/2013
1,1,1,2-Tetrachloroethane	3.2	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	2.8	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	4.5	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	1.9	**1.13**	0.5 U	0.5 U
Benzene	1.4	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.36	0.5 U	0.5 U	0.5 U
Chloroform	0.71	**0.3 J**	0.5 U	0.5 U
cis-1,2-Dichloroethene	380[2]	**15.1**	**48.6**	0.5 U
Methylene chloride	720	**0.17 J**	**0.34 J**	1 U
Naphthalene	4	0.5 U	0.5 U	0.5 U
Tetrachloroethene	13	**0.58 J**	0.5 U	0.5 U
trans-1,2-Dichloroethene	380	**0.31 J**	**1.72 J**	0.5 U
Trichloroethene	1.1	**4.91**	**29.4**	0.5 U
Vinyl chloride	0.14	0.5 U	0.5 U	0.5 U

Note: All units in micrograms per liter.

Screening levels are US Environmental Protection Agency Groundwater Vapor Intrusion Screening Level (VISL) for residential use (November 2013 update), an excess lifetime cancer risk (ELCR) of 1×10^{-6}, and/or a noncancer hazard quotient (HQ) of 1.0, unless otherwise noted.

[1] A USEPA VISL does not exist for cis-1,2-dichloroethene. For this reason, trans-1,2-dichloroethene was used as a surrogate for this chemical.

Bold indicates the analyte was detected

Shading indicates the analyte exceeded screening criteria

J = Reported value is estimated

U = Not detected above the laboratory reporting limit.

VOC = volatile organic compound

TABLE 4

Summary of Chemicals Detected in Indoor Air, Ambient Air, and Subslab Samples: January 2014

Vapor Intrusion Assessment, Private Property PP-2, St. Louis, Missouri

Analyte	Location>> Sample Date>> Analytical Method>> Indoor/Outdoor Air Screening Level [1]	SLOP-6317-IA-NE 3/1/2008 TO-15 SIM Indoor Air	LOP-6317-IA-N 5/1/2008 TO-15 SIM Indoor Air	LOP-6317-IA-SV 3/1/2008 TO-15 SIM Indoor Air	SLOP-6317-IA-SW 5/1/2008 TO-15 SIM Indoor Air	PP02-IA-01 2/16/2012 TO-15 SIM Indoor Air	PP02-IA-01-FD 2/16/2012 TO-15 SIM Indoor Air	PP02-IA-01 1/13/2014 TO-15 SIM Indoor Air	PP02-IA-01-FD 1/13/2014 TO-15 SIM Indoor Air	SLOP-6317-AA-N 3/1/2008 TO-15 SIM Outdoor Air	SLOP-6317-AA-N 5/1/2008 TO-15 SIM Outdoor Air	PP02-AA-01 2/16/2012 TO-15 SIM Outdoor Air	PP02-AA-01 1/13/2014 TO-15 SIM Outdoor Air	Subslab Soil Gas Screening Level [1]	PP02-SG-01 2/16/2012 TO-15 SIM	PP02-SG-02 2/16/2012 TO-15 SIM Subslab Soil Gas	PP02-SG-01 1/13/2014 TO-15 SIM Subslab Soil Gas	PP02-SG-02 1/13/2014 TO-15 SIM Subslab Soil Gas
1,1,2,2-Tetrachloroethane	0.042	NA	NA	NA	NA	0.026 U	0.020 U	*0.076 U*	*0.066 U*	NA	NA	0.022 U	*0.066 U*	0.42	**0.12 J**	**0.10 J**	0.064 U	**4.11**
1,1,2-Trichloroethane	0.15	NA	NA	NA	NA	0.020 U	0.016 U	0.061 U	0.053 U	NA	NA	0.018 U	0.053 U	1.5	0.016 U	0.020 U	0.051 U	**0.435**
1,2-Dichloroethane (1,2-DCA)	0.094	**0.072**	**0.062**	**0.088**	**0.063**	**0.077 J**	**0.077 J**	**0.068 J**	0.068 U	**0.075**	**0.06**	**0.076 J**	**0.065 J**	0.94	**0.024 J**	0.015 U	0.038 U	**0.11**
Benzene	0.31	NA	NA	NA	NA	**1.6**	**1.5**	**1.1**	**1.1**	NA	NA	**1.7**	**1.1**	3.1	**0.23**	**0.16**	0.21 U	0.19 U
Carbon tetrachloride	0.41	NA	NA	NA	NA	**0.55**	**0.53**	**0.36**	**0.37**	NA	NA	**0.54**	**0.36**	4.1	**0.55**	**0.42**	**0.36**	**0.4**
Chloroform	0.11	NA	NA	NA	NA	**0.56**	**0.58**	**0.26**	**0.25**	NA	NA	**0.24**	**0.17**	1.1	**9.1**	**0.063 U**	**8.5**	**1.4**
cis-1,2-Dichloroethene	63 [2]	**0.15**	**0.058**	**0.18**	**0.044**	0.037 U	**0.045 J**	0.044 U	0.038 U	0.036 U	0.036 U	**0.32**	0.038 U	630 [2]	**11**	**0.77**	**7.2**	**0.098**
Methylene chloride	96	NA	NA	NA	NA	**0.75 J**	**0.67 J**	**0.61**	**0.68**	NA	NA	**0.54 J**	**0.37**	960	**0.069 J**	**0.094 J**	0.055 U	0.11 U
Naphthalene	0.072	NA	NA	NA	NA	**0.098 J**	**0.53**	**0.19 J**	**0.62 J**	NA	NA	**0.17**	*0.30 U*	0.72	**0.1 J**	**0.90**	**0.24 J**	0.30 U
Tetrachloroethene (PCE)	9.4	0.25 U	**0.12**	**0.91**	**0.1**	**0.32**	**0.31**	**0.27**	**0.25**	**0.3**	**0.099**	**0.20 J**	**0.098 J**	94	**8.4**	**1.5**	**5.2**	**3.6**
trans-1,2-Dichloroethene	63	**0.012 J**	0.043 U	**0.013 J**	0.036 U	0.015 U	0.011 U	0.044 U	0.038 U	**0.0052 J**	0.036 U	**0.036 J**	0.038 U	630	**0.12 J**	**0.047 J**	0.12	**0.062 J**
Trichloroethene (TCE)	0.43	**0.41**	**0.16**	**1.1**	**0.13**	0.18 U	**0.16**	**0.089 J**	0.084 U	**0.19**	**0.019**	**0.18**	**0.052 J**	4.3	**40**	**0.32**	**19.2**	**0.72**
Vinyl Chloride	0.16	0.023 U	0.043 U	**0.0047 J**	0.036 U	0.0095 U	0.0073 U	0.028 U	0.024 U	0.024 U	0.036 U	**0.050 J**	0.024 U	1.6	**0.050 J**	**0.22**	0.024 U	0.024 U

Note: All units in micrograms per cubic meter.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NA - Not Analyzed

U - Analyte was not detected above the method detection limit.

Bold indicates the analyte was detected above the method detection limit.

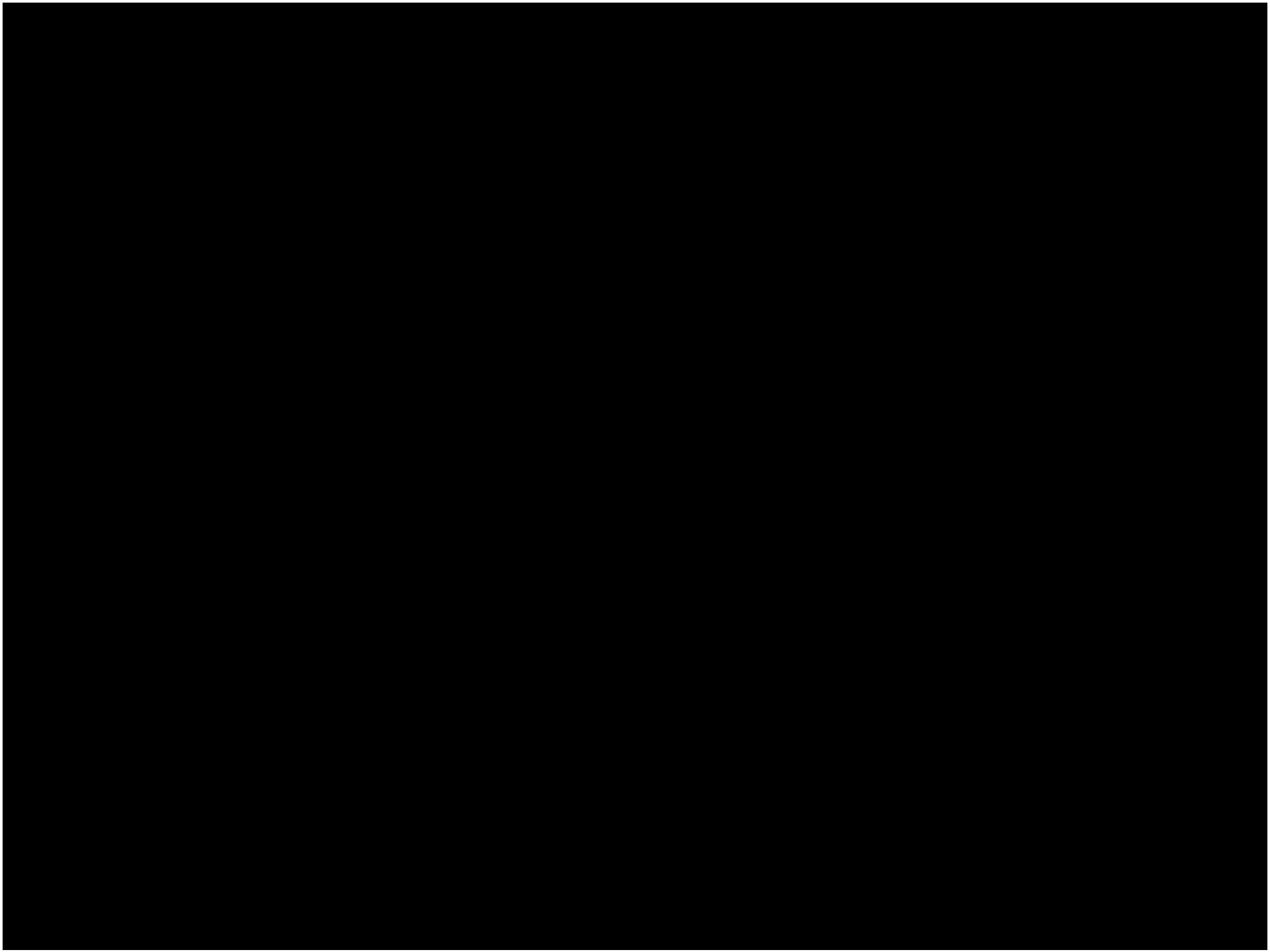
Bold and shading indicates the result was detected and exceeded screening criteria.

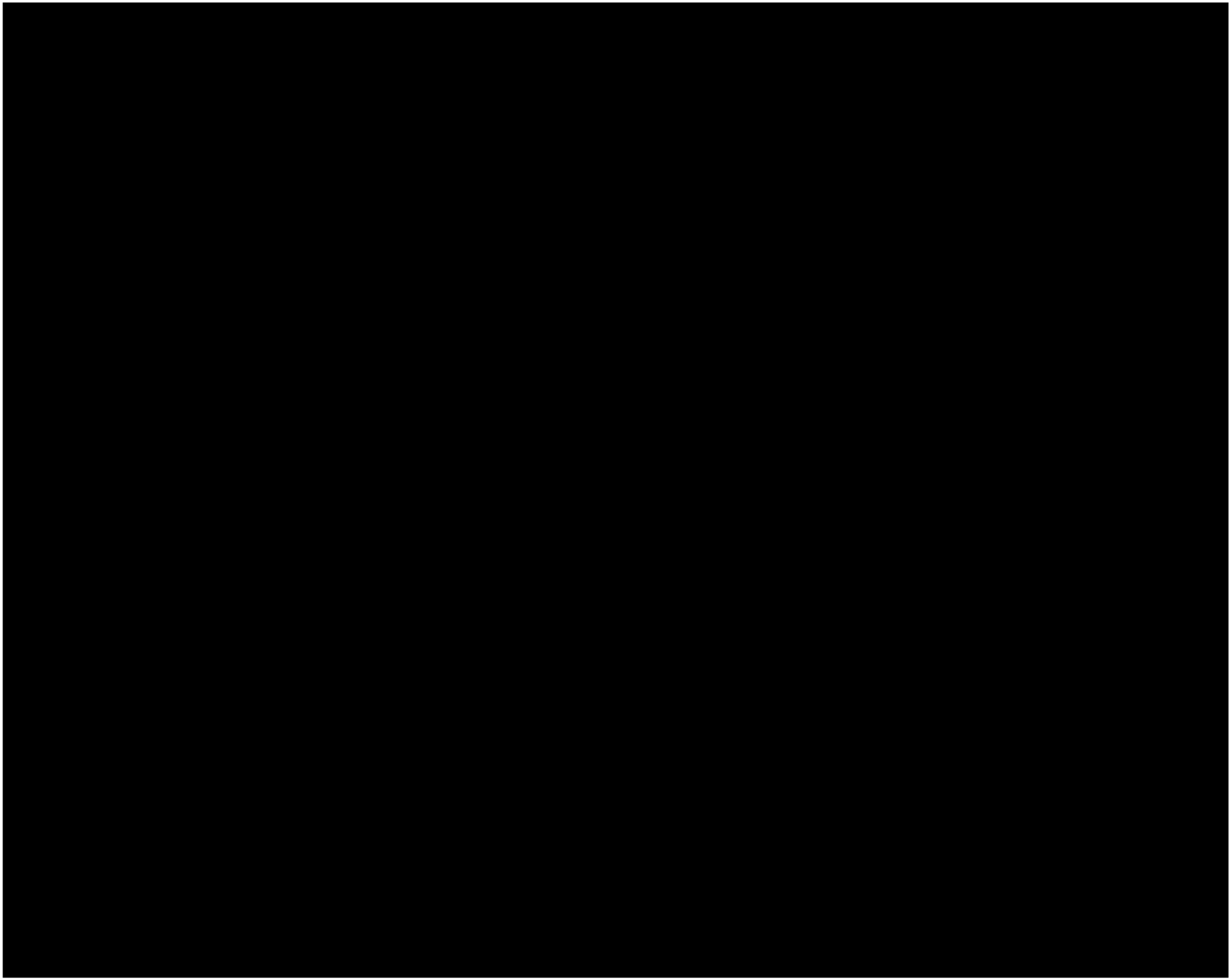
Italicized values represent nondetected chemicals with a method detection limit that exceeded the screening level.

[1] U.S. Environmental Protection Agency (USEPA) Vapor Intrusion Screening Level (VISL) for residential use (November 2013 update), an excess lifetime cancer risk (ELCR) of 1×10^{-6}, and/or a noncancer hazard quotient (HQ) of 1.0, unless otherwise noted.

[2] A USEPA VISL does not exist for cis-1,2-dichloroethene. For this reason, trans-1,2-dichloroethene was used as a surrogate for this chemical.

Figures





Attachment 1
Building Inspection Forms

Building Survey - Indoor Air Sampling

Project Information — Page 1 of 3

Project Name: St. Louis Ordnance Plant
Project # : 459603.01.VI.RS.01
Survey Completed By: T. Swierczek
Date: 01/13/14
Building Address: Private Property 2
Residence ID: PP-2

Resident and Contact Information

Name of Occupant: Private Owner
Owner / Tenant / Other: Owner
Occupant Phone #s: Home: Work: Cell:
Duration at Current Residence: 3 years
Best Time To Call / Visit:
Number of Building Occupants: Children (list ages): Adults: 2
(If Rental) Property Owner Name: *Owner Phone #s: Home:*
Owner Address: *Work:*
Name of Interviewee for Building Survey: [redacted]
Notes: [redacted]

Building Construction Characteristics

Building Type: (Check box for all that apply)

- [X] Single Family Residential
- [ ] Multi Family Residential
- [ ] Commercial
- [X] Ranch
- [ ] Two-story
- [ ] Other (specify):
- [ ] Split Level
- [ ] Tri Level
- [ ] Duplex (# of other half of duplex):
- [ ] Apartment (# of units in Building):

Describe Building: (General Description, Construction Materials, etc) Brick structure

Approximate Age: 83 years **Approximate Area:** Total Living Space: 900 sq.ft. First Floor: 900 sq.ft.

Floors: # Floors at or above grade: 1

Which floors of he residence are utilized as living space / occupied? Main floor

Foundation Type:

Crawl Space: No
Slab on Grade: No
Basement: Yes

Foundation Description: (Split Foundation or Multiple Types)

Poured concrete walls

Slab & Crawl Space Construction:

Basement or Crawl Space Details: (if applicable)

Finished Basement: No
Basement Finished When:
Approximate Area: 900 sq.ft.

Basement or Crawl Space Floor: (Check box for all that apply)

- [X] Concrete
- [ ] Dirt
- [ ] Floating (built on top of actual floor)
- [ ] Other (specify):

Foundation Walls: (Check box for all that apply)

- [X] Poured Concrete
- [ ] Block
- [ ] Stone
- [X] Other (specify): Concrete/brick foundation

Does the basement or crawl space have a moisture problem - dampness? (Check only one)

- [X] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [ ] No

Is the basement or crawl space ever wet - flooded? (Check only one)

- [ ] Yes, frequently (3 or more times/year)
- [ ] Yes, occasionally (1-2 times/year)
- [ ] Yes, rarely (less than 1 time/year)
- [X] No

Building Survey — Page 2 of 3

Building Address: Private Property 2, St. Louis, MO
Date: 1/13/2014

Basement or Crawl Space Details Continued: (if applicable)

Does the basement have any of the following? (Check all that apply)

[ ] Floor cracks [X] Wall cracks [X] Floor Drain [ ] Sump pump

[ ] Other hole / opening in floor (describe): .....

Is the sump pump used? ..... Depth of sump? ..... Where does he sump pump drain? .....

Describe ventilation of crawl space: .....

.....

Description of ground cover outside of building: [X] Grass [X] Concrete [ ] Asphalt [ ] Other: .....

Heating & Ventilation Systems

Heating System - Fuel Type: (Check box for all that apply)

[X] Natural Gas [ ] Electric [ ] Coal [ ] Fuel Oil

[ ] Wood [ ] Other (specify): .....

Heating - Conveyance System: (Check box for all hat apply)

[X] Forced Hot Air [ ] Electric Baseboard [ ] Wood Stove [ ] Fireplace

[ ] Forced Hot Water [ ] Hot Water Radiation [ ] Heat Pump [ ] Kerosene Heater

[ ] Other (specify): .....

Type of Ventilation System: (Check box for all that apply)

[X] Central air handler / blower [X] Mechanical / ceiling fans [ ] Bathroom ventilation fans [ ] Air-to-air heat exchanger

[ ] Kitchen range hood fan [X] Other (specify): **Vent fan over stove**

Does the Residence have Air Conditioning: (Check box for all that apply)

[X] Central Air Conditioning [ ] Window Air Conditioners [ ] Other (specify): .....

Describe the current operating conditions of the HVAC system: **HVAC system is currently operational. Furnace was running at the time of the inspection.**

Miscellaneous Information

Does the Residence have any of the following?

Septic System? **No** Irrigation / Private Well? .....

Existing subsurface depressurization (radon) system in place? **No** Is it running? .....

Is there standing water outside the residence (pond, ditch, swale)? **Yes** If so, describe: **Rainwater will accumulate under front porch and leak into the basement through cracks in the walls**

Has he residence been retrofitted / weatherized with any of the following? (Check box for all that apply)

[X] Insulation [X] Storm Windows [X] Energy-efficient windows [ ] Other (specify): .....

Does the building have an attached garage? **No** If so, is a car usually parked in the garage? .....

Chemicals

Have any pesticides / herbicides been applied around the building foundation or in the yard / gardens? **No**

If so, when - and which chemicals? .....

Has he residence had a pesticide treatment inside? **No** When / by whom? .....

Do the occupants of the building have their clothes dry-cleaned? **Yes**

When were dry-cleaned clothes last brought into the building? **Infrequent (~2.5 years ago)**

Have the occupants ever noticed any unusual odors in he building? **No**

Describe (with location): .....

Building Address: **Private Property PP-2, St. Louis, MO** Date: **1/13/2014**

Miscellaneous Information Continued:

Have there been any known spills of a chemical immediately outside or inside the building? **No**

Describe (with location):

Do any of the occupants smoke inside the building? **No** How often?

Do any of the occupants use solvents at work? **No** Are their clothes washed at home? **Yes**

If so, when - and what rooms? **Clothes are regularly washed. Washer and dryer are located in the basement.**

Within the last 6 months, has there been any painting or remodeling in the residence? **No** If so, when

What rooms, and what specifically was done?

Within the last 6 months, has any new carpeting been installed? **No** Have the carpets or rugs been cleaned? **No**

If so, when, what rooms, and what cleaners?

Consumer Products Inventory

Check consumer products that are present in the residence.

		Storage Location	Frequency of Usage	Date of Last Use
☐	Paint or Wood Finishes (spray or can)			
☐	Paint stripper / remover / thinner			
☐	Solvent cleaners (eg. spray-on oven cleaner)			
☐	Metal degreaser / cleaner			
☐	Gasoline / diesel fuel			
☐	Glues or adhesives (super glue, etc)			
☐	Air fresheners & scented candles			
☐	Laundry / carpet spot removers			
☐	Pes icides / Insecticides			
☐	Nail polish remover (acetone)			
☐	Aerosols (deodorizers, polish, cleaners)			
☐	Other:			
☐	Other:			
☐	Other:			

Describe any products that are containerized during sampling event:

Refer to chemical inventory Table 1.

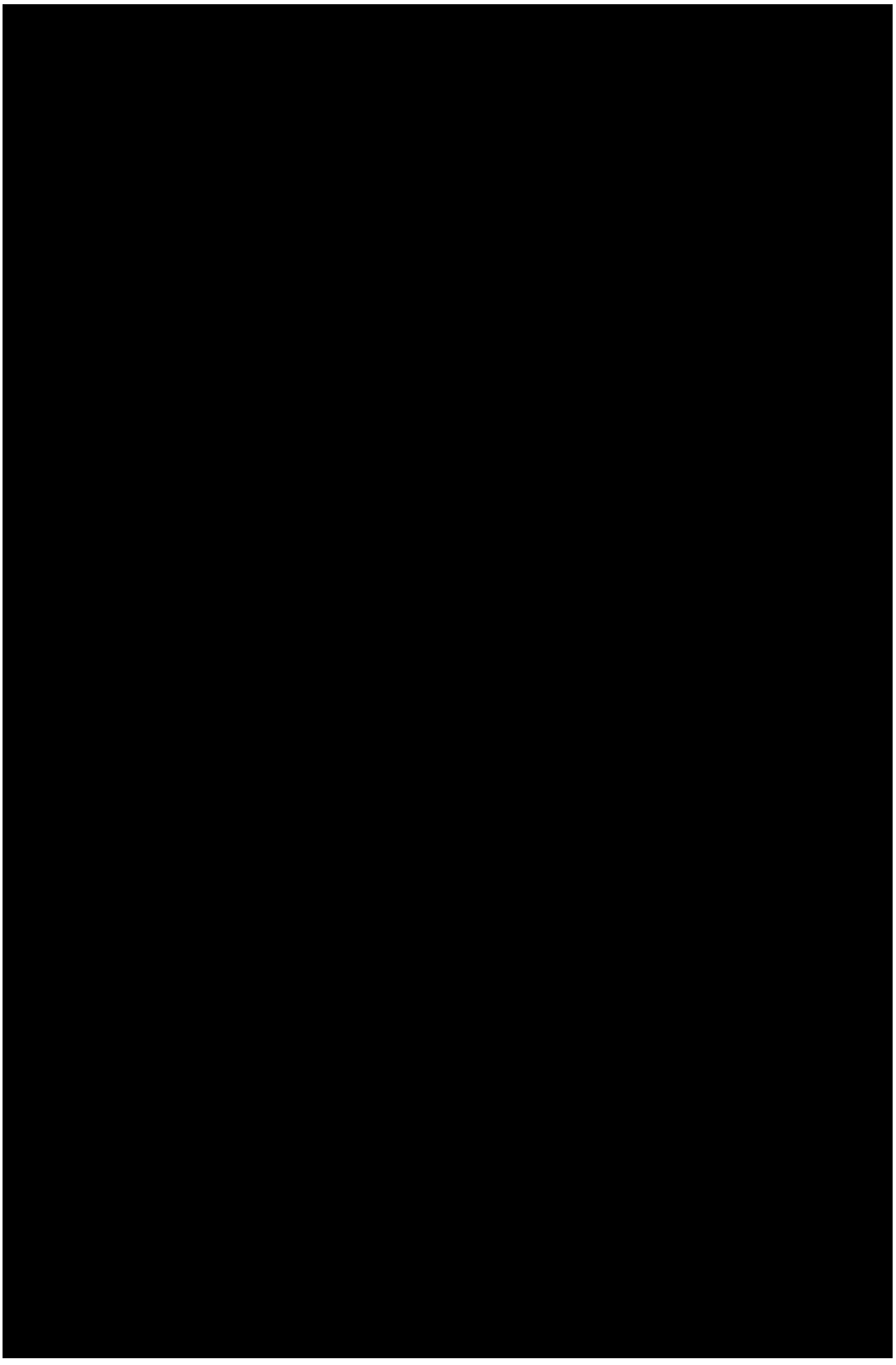
Provide any additional information that is provided by interviewee:

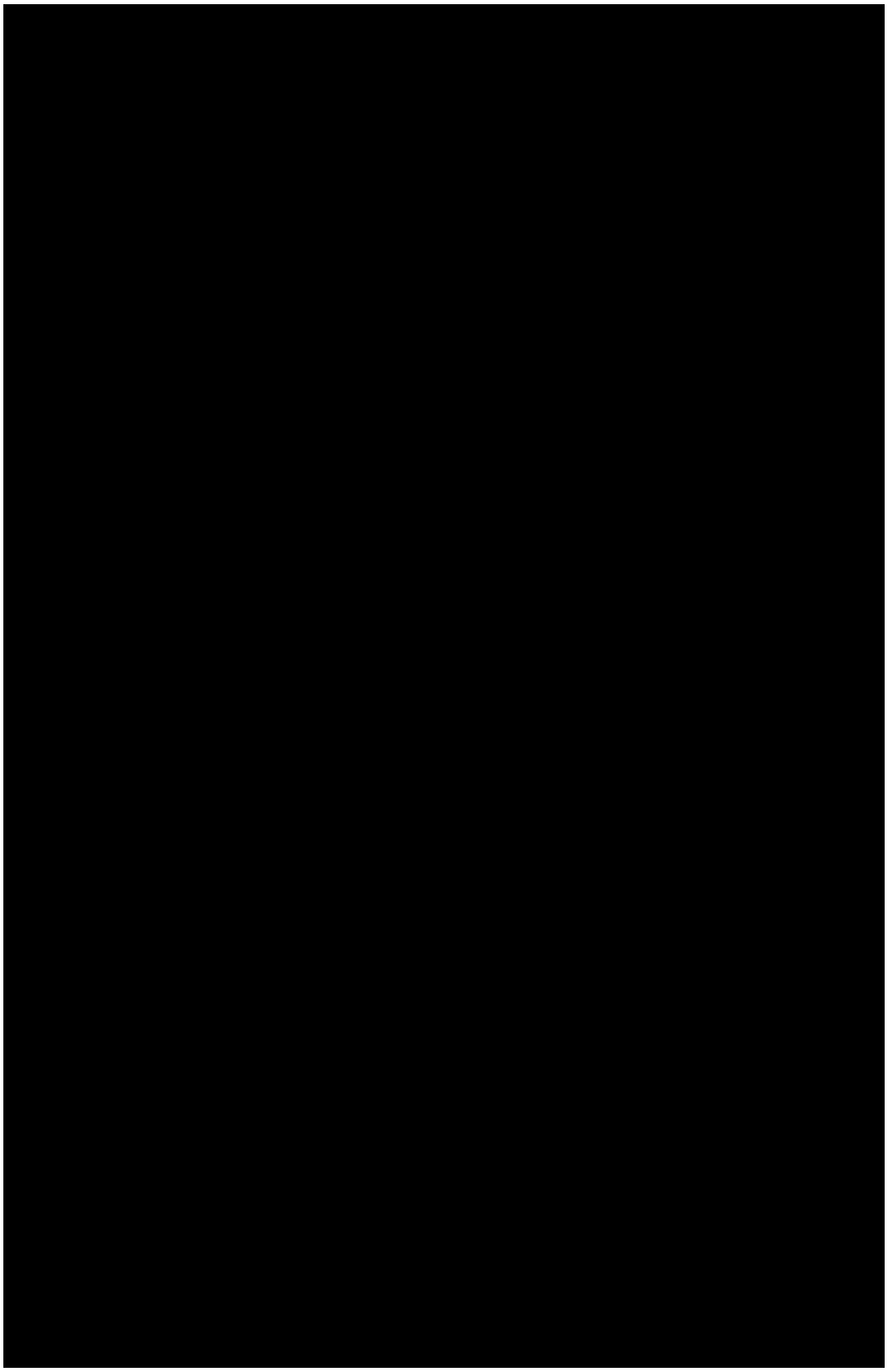
Standing water when rain infiltrates cracks in wall beneath front porch. Severe cracks in wall observed on the south wall and possible mold. Drain located near washer occassionally backs up during washing.

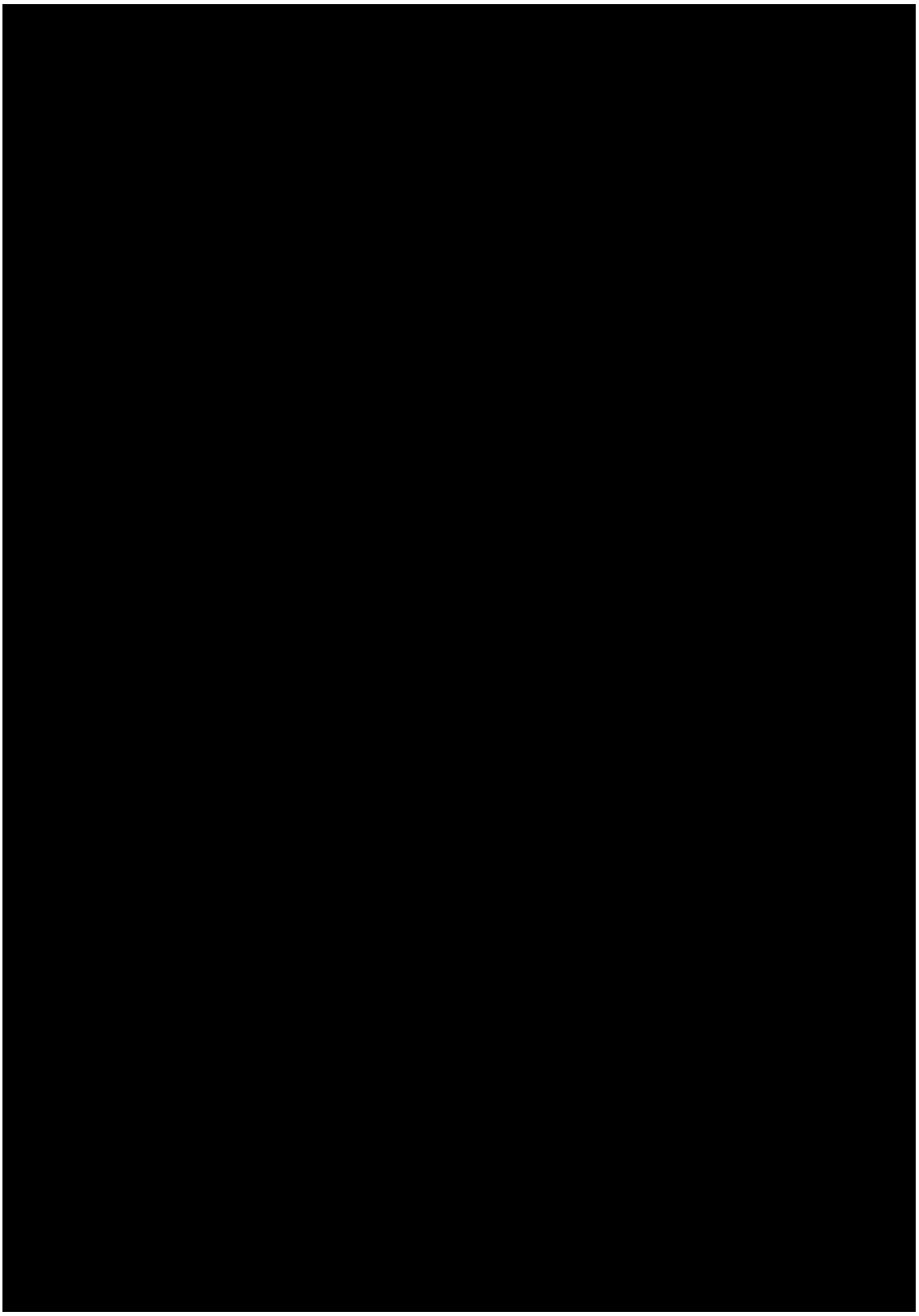
Attachment 2
Photographs

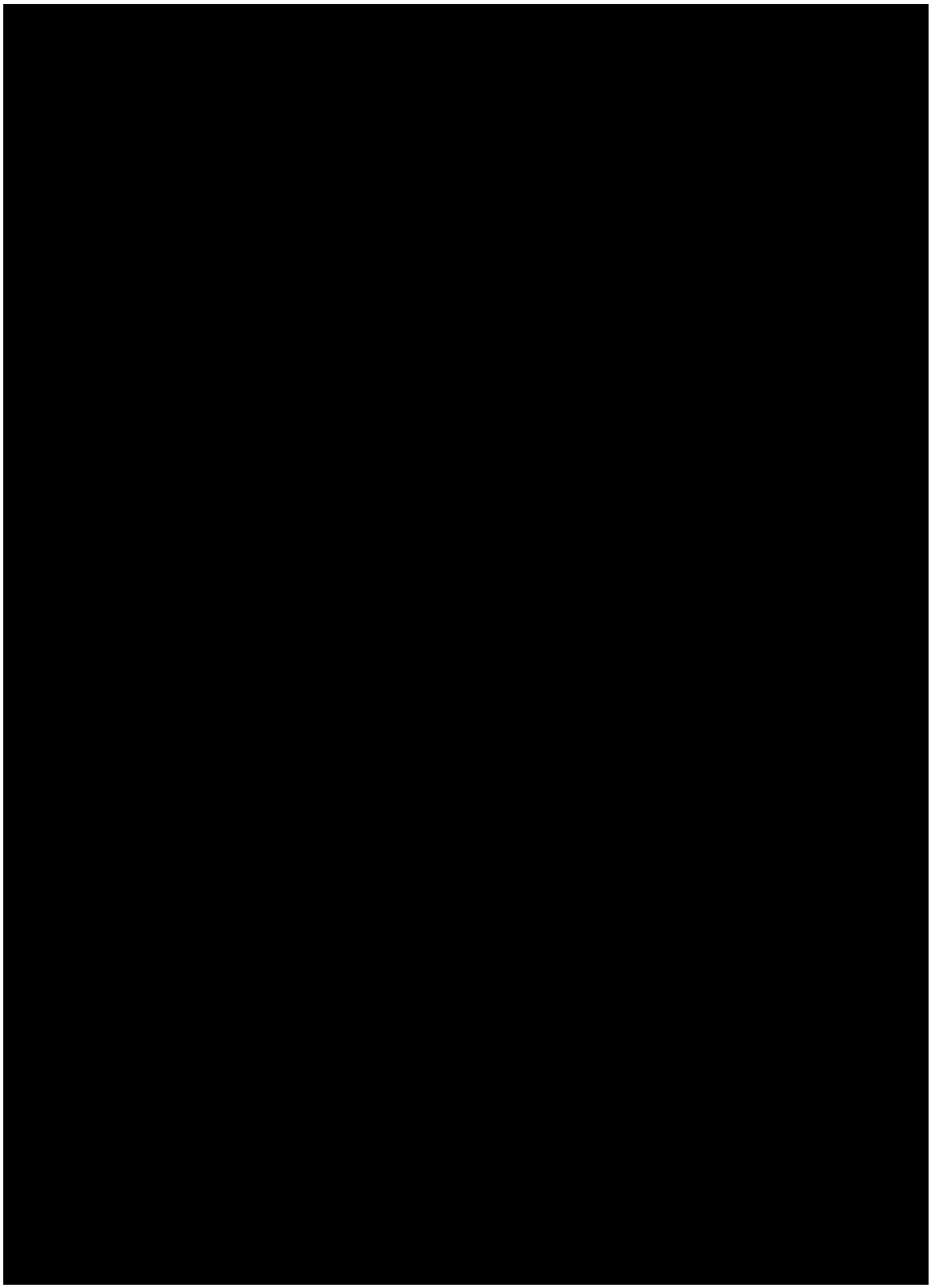
ATTACHMENT 2

Private Property PP-2 Photograph Log









Attachment 3
Groundwater Sampling Forms

Groundwater Purging and Sampling Form

Project Name: SLOP OU-2
Project Number: 459603.01.VI.GW
Sheet 1 of 1
Sample Source (Well No./Location): MW-107S
Date: 12/17/2013
Weather Conditions: 37 degrees, cloudy
Well Condition: Good
Sample Team: Tony Swierczek
Sample Equipment: Peristaltic Pump

Well Stabilization Data

Datum: BTOC
Well Volume:
Time Purging begins (T_o) 1343
Well Depth: 13 (ft)
1V = _____(gal)
Water Level at time T_o 4.22
Static Water Level: 4.07 (ft)
3V = _____(gal)
Time Purging ends (T_1) 1358
Water Column: 8.93 (ft)
5V = _____(gal)
Water Level at time T_1 4.52
Diameter : 2 " PVC
Pumping System Volume 0.54 (L)

Time	Volume Removed (L)	pH ± 0.1	SPCOND (mS/cm) ± 20 µmho/cm[1]	TEMP.(C) ± 0.5	Redox (mV) ± 10 mV	Water level (Ft) < 1.0 ft	D.O. (mg/L) ± 10%[2]	Turbidity (NTU)	Purge rate (Lpm)	Appearance
1:43 PM	0.0	6.40	1.049	13.59	-22.7	4.22	5.88	2.93	0.1	Clear
1:46 PM	0.3	6.38	1.051	13.76	-7.9	4.31	5.24	2.33	0.1	Clear
1:49 PM	0.6	6.36	1.055	13.84	-4.6	4.38	5.18	2.13	0.1	Clear
1:52 PM	0.9	6.35	1.054	13.81	-2.9	4.43	5.14	1.82	0.1	Clear
1:55 AM	1.2	6.35	1.054	13.92	-1.8	4.48	5.14	1.86	0.1	Clear
1:58 AM	1.5	6.35	1.055	13.99	-1.4	4.52	5.14	1.74	0.1	Clear

[1] Specific conductance: ± 1% of full-scale reading (instrument repeatability) or default ± 20 µmho/cm
[2] Dissolved oxygen: ± 0.1 mg/L for values < 1 mg/L, or ± 10% for values >1 mg/L

Sample Information

Sample ID: MW-107S-121713
Analysis: Select VOCs
Date: 12/ 17 /2013
Time: 14:00
Field Filtering: _____ Filter Type _____
Laboratory: Empirical Method of Shipment: FedEx
Remarks: _____

Groundwater Purging and Sampling Form

Project Name: SLOP OU-2
Project Number: 459603.01.VI.GW
Sheet 1 of 1
Sample Source (Well No./Location): MW-108S
Date: 12/18/2013
Weather Conditions: 31 degrees, sunny
Well Condition: Good
Sample Team: Mike Rodriguez
Sample Equipment: Peristaltic Pump

Well Stabilization Data

Datum: BTOC
Well Volume:
Time Purging begins (T_o) 1022
Well Depth: 13 (ft)
1V = _____(gal)
Water Level at time T_o 2.88
Static Water Level: 3.43 (ft)
3V = _____(gal)
Time Purging ends (T_1) 1043
Water Column: 9.57 (ft)
5V = _____(gal)
Water Level at time T_1 3.44
Diameter : 2 " PVC
Pumping System Volume 0.54 (L)

Time	Volume Removed	pH ± 0.1	SPCOND (mS/cm) ± 20 µmho/cm[1]	TEMP.(C) ± 0.5	Redox (mV) ± 10 mV	Water level (Ft) < 1.0 ft	D.O. (mg/L) ± 10%[2]	Turbidity (NTU)	Purge rate (Lpm)	Appearance
10:22 AM	0.0	6.64	1.180	12.79	91.3	2.88	4.55	18.5	0.1	Clear
10:25 AM	0.3	6.64	1.185	12.91	96.6	3.03	4.28	6.06	0.1	Clear
10:28 AM	0.6	6.64	1.191	12.97	77.8	3.20	4.37	2.82	0.1	Clear
10:31 AM	0.9	6.63	1.189	13.09	61.6	3.31	4.28	1.73	0.1	Clear
10:34 AM	1.2	6.62	1.189	13.13	53.1	3.34	4.25	1.61	0.1	Clear
10:37 AM	1.5	6.62	1.189	13.14	50.1	3.39	4.25	1.42	0.1	Clear
10:40 AM	1.8	6.62	1.185	13.15	56.8	3.44	4.05	1.36	0.1	Clear
10:43 AM	2.1	6.62	1.82	13.15	56.8	3.44	4.05	1.36	0.1	Clear

[1] Specific conductance: ± 1% of full-scale reading (instrument repeatability) or default ± 20 µmho/cm
[2] Dissolved oxygen: ± 0.1 mg/L for values < 1 mg/L, or ± 10% for values >1 mg/L

Sample Information

Sample ID: MW-108S-121813
Analysis: Select VOCs
Date: 12/18/2013
Time: 10:48 AM
Field Filtering: _____ Filter Type _____
Laboratory: Empirical Method of Shipment: FedEx
Remarks: _____

Groundwater Purging and Sampling Form

Project Name: SLOP OU-2
Project Number: 459603.01.VI.GW
Sheet 1 of 1
Sample Source (Well No./Location): MW-109S
Date: 12/18/2013
Weather Conditions: 31 degrees, sunny
Well Condition: Good
Sample Team: Tony Swierczek
Sample Equipment: Peristaltic Pump

Well Stabilization Data

Datum: BTOC
Well Volume:
Time Purging begins (T_o) 1023
Well Depth: 13 (ft)
1V = _____(gal)
Water Level at time T_o 3.23
Static Water Level: 3.40 (ft)
3V = _____(gal)
Time Purging ends (T_1) 1038
Water Column: 9.60 (ft)
5V = _____(gal)
Water Level at time T_1 3.48
Diameter : 2 " PVC
Pumping System Volume 0.54 (L)

Time	Volume Removed (L)	pH ± 0.1	SPCOND.(mS/cm) ± 20 µmho/cm[1]	TEMP.(C) ± 0.5	Redox (mV ± 10 mV	Water level (Ft) < 1.0 ft	D.O. (mg/L) ± 10%[2]	Turbidity (NTU)	Purge rate (Lpm)	Appearance
10:23 AM	0.0	6.5	1.185	13.39	-9.7	3.23	5.52	1.96	0.1	Clear
10:26 AM	0.3	6.37	1.186	13.25	6.9	3.31	4.87	2.09	0.1	Clear
10:29 AM	0.6	6.35	1.185	13.22	12.7	3.35	4.77	1.22	0.1	Clear
10:32 AM	0.9	6.31	1.187	13.20	18.8	3.39	4.76	1.81	0.1	Clear
10:35 AM	1.2	6.27	1.188	13.34	27	3.44	4.63	1.38	0.1	Clear
10:38 AM	1.5	6.32	1.189	13.4	23.4	3.48	4.34	1.04	0.1	Clear

[1] Specific conductance: ± 1% of full-scale reading (instrument repeatability) or default ± 20 µmho/cm

[2] Dissolved oxygen: ± 0.1 mg/L for values < 1 mg/L, or ± 10% for values >1 mg/L

Sample Information

Sample ID: MW-109S-121813
Analysis: Select VOCs
Date: 12/18/2013
Time: 10:40 AM
Field Filtering: _____ Filter Type _____
Laboratory: Empirical Method of Shipment: FedEx
Remarks: _____

Attachment 4
Data Quality Evaluation Report

Data Quality Evaluation Report for Vapor Intrusion Assessment for Private Property 2

PREPARED FOR: U.S. Army Corps of Engineers–Kansas City District

PREPARED BY: CH2M HILL

DATE: March 17, 2014

Introduction

The object of the data quality evaluation was to assess the quality of analytical results for groundwater, indoor air, ambient outdoor air, and subslab soil gas samples collected December 17–18, 2013, and January 13, 2014, respectively, during the vapor intrusion assessment for Private Property 2 (PP-2) at former Hanley Area of the St. Louis Ordnance Plant in St. Louis, Missouri. Individual method requirements and guidelines from the Uniform Federal Policy-*Final Quality Assurance Project Plan, RI/FS Activities for Operable Unit 2, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri* (OU-2 RI work plan) (CH2M HILL 2013) were used as the basis for this assessment.

Analytical Approach

The object of sampling and analysis for the vapor intrusion assessment for PP-2 was to determine the presence or absence of volatile organic compounds contamination in groundwater and air at the site.

Analytical Data

This DQE covers three normal groundwater samples, one ambient air normal sample, one indoor air normal sample, two soil gas normal samples, one indoor air field duplicate sample, and two trip blanks. The data were reported in three sample delivery groups (SDG) listed as 1312133, 1312151 and N1085. Table 1 lists the samples and collection dates. The air samples were delivered to CH2M HILL's Applied Sciences Laboratory in Corvallis, Oregon, and analyzed by Method TO-15 SIM. The groundwater samples were delivered to Empirical Laboratories LLC in Nashville, Tennessee, and analyzed by Method SW8260B.

TABLE 1

Samples Associated with DQE

St. Louis Ordnance Plant Vapor Intrusion Assessment Report for PP-2, St. Louis, Missouri

Matrix	Sample ID	QA/QC Type	Sample Date	Sample Delivery Group
AIR	PP02-AA-01-011314	Normal	January 13, 2014	N1085
AIR	PP02-IA-01-011314	Normal	January 13, 2014	N1085
AIR	PP02-IA-01-011314-FD	Field Duplicate	January 13, 2014	N1085
AIR	PP02-SG-01-011314	Normal	January 13, 2014	N1085
AIR	PP02-SG-02-011314	Normal	January 13, 2014	N1085
Water	MW-107S-121713	Normal	December 17, 2013	1312133
Water	Trip Blank 02693	Trip Blank	December 17, 2013	1312133
Water	MW-108S-121813	Normal	December 18, 2013	1312151
Water	MW-109S-121813	Normal	December 18, 2013	1312151
Water	Trip Blank 02692	Trip Blank	December 18, 2013	1312151

AA = ambient air
IA = indoor air

TABLE 1

Samples Associated with DQE

St. Louis Ordnance Plant Vapor Intrusion Assessment Report for PP-2, St. Louis, Missouri

Matrix	Sample ID	QA/QC Type	Sample Date	Sample Delivery Group

SG = soil gas
MW = monitoring well

One hundred percent of the data were reviewed and verified in accordance with the OU-2 RI work plan. The review included the following items:

- A review of the sample delivery group narrative to identify issues that the laboratory reported in the data deliverable
- A check of sample integrity (chain of custody, preservation, and holding times)
- An evaluation of quality control measurements used to assess the accuracy, precision, and representativeness of data including instrument tuning, internal standards, calibrations, quality control blanks, laboratory control samples, laboratory control sample duplicates, matrix spike samples, matrix spike sample duplicates, surrogate recoveries, and field or laboratory duplicate results
- A review of sample results, target compound lists, and detection limits to verify that project analytical requirements were met
- A review to verify that corrective actions were initiated, as necessary, based on the data review findings
- Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations

Data flags were assigned according to the OU-2 RI work plan. The flags and the reason for each flag were entered into the electronic database. Multiple flags are routinely applied to specific sample method, matrix, and analyte combinations, but there will be only one final flag. The data reported will be qualified by a single flag that reflects the most conservative of the applied validation qualifiers. The final flag also includes matrix and blank sample impacts. The data flags are defined as follows:

J The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.

R The sample result was rejected because of serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Findings

The findings of the data review and verification are summarized in the following sections. As noted, the flags in the final data tables reflect the most severe verification qualifier. Table 2 lists the verification findings, along with the verification reason codes.

TABLE 2

Verification Findings

St. Louis Ordnance Plant Vapor Intrusion Assessment Report for PP-2, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Air	TO15 SIM	Naphthalene	PP02-IA-01-011314	0.199	UG/M3	J	FD>RPD

Air	TO15 SIM	1,2-Dichloroethane	PP02-IA-01-011314-FD	0.068	UG/M3	U	FlowController<RL
Air	TO15 SIM	Naphthalene	PP02-IA-01-011314-FD	0.629	UG/M3	J	FD>RPD
Air	TO15 SIM	Trichloroethene (TCE)	PP02-IA-01-011314-FD	0.085	UG/M3	U	FlowController<RL
Air	TO15 SIM	Benzene	PP02-SG-01-011314	0.21	UG/M3	U	CanCert<RL , LB<RL
Air	TO15 SIM	Methylene chloride	PP02-SG-01-011314	0.055	UG/M3	U	LB<RL
Air	TO15 SIM	Benzene	PP02-SG-02-011314	0.193	UG/M3	U	LB<RL
Air	TO15 SIM	Methylene chloride	PP02-SG-02-011314	0.114	UG/M3	U	LB<RL

CanCert<RL	The analyte was detected in the canister at a concentration less than the reporting limit
FD>RPD	The relative percent difference exceeded criteria in the FD pair
FlowController<RL	The analyte was detected in the flow controller at a concentration less than the reporting limit
LB<RL	The analyte was detected in the method blank at a concentration less than the reporting limit

Holding Times

All holding time criteria were met.

Calibration

All initial and continuing calibration requirements were met.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination with the following exceptions. Benzene and methylene chloride were detected at concentrations less than the limit of quantitation in the method blank associated with Method TO-15 SIM. The data were qualified as not detected and flagged “U,” when the associated sample concentrations were less than 5 times (10 times for methylene chloride) the concentration detected in the blank.

Field Blanks

Field blanks were collected and analyzed as required and were free of contamination.

Field Duplicates

A field duplicate was collected at the required frequency of 1 for every 10 normal samples collected per matrix. Table 3 compares the normal sample counts and field duplicate sample counts.

TABLE 3
Normal and Field Duplicate Sample Counts by Matrix and Method
St. Louis Ordnance Plant Vapor Intrusion Assessment Report for PP-2, St. Louis, Missouri

Matrix	Method	Normal Sample Count	Field Duplicate Sample Count
Air	TO-15 SIM	4	1
Water	SW8260B	3	0[a]

[a] The field duplicate reported in the sample delivery groups were not associated with PP-2.

Table 4 lists the field duplicate and associated parent sample. The field duplicates collected for the groundwater samples were not associated with PP-2 and therefore, are not included in this memorandum.

TABLE 4
List of Field Duplicates
St. Louis Ordnance Plant Vapor Intrusion Assessment Report for PP-2, St. Louis, Missouri

Matrix	Field Duplicate Sample ID	Parent Sample ID
Air	PP02-IA-01-011314-FD	PP02-IA-01-011314

The relative percent differences (RPD) between the normal and field duplicate samples met acceptance criteria with the following exception. The RPD for naphthalene exceeded criteria in FD pair PP02-IA-01-011314/PP02-IA-01-011314-FD. The data were qualified as estimated and flagged "J" in the field duplicate pair.

Matrix Spikes

A matrix spike/matrix spike duplicate was collected at the required frequency of one MS/MSD for every 20 normal groundwater samples per the OU-2 RI work plan. However, matrix spikes/matrix spike duplicates collected were not associated with PP-2 and therefore are not included in this memorandum.

Surrogates

Surrogates were used according to method requirements and all acceptance criteria were met.

Laboratory Control Samples

Laboratory control samples and laboratory control sample duplicates were analyzed as required, and all acceptance criteria were met.

Internal Standards

Internal standard recovery criteria were met for all samples.

Canister/Flow Controller Certifications

The air and soil gas samples were collected in SUMMA canisters, which were certified by the laboratory per project instructions before shipment to the project site. However, the laboratory was unable to certify all canisters and flow controllers clean to the detection limit for all target analytes. Therefore, some low-level detections in the samples may be due to contamination in the canisters and flow controllers.

The canisters and flow controllers were free of contamination with the following exceptions. Several analytes were detected in canisters or flow controllers at concentrations below the reporting limit. Data were qualified as not detected and flagged "U" when sample concentrations were less than five times the concentrations detected in the canisters or flow controllers.

Chain of Custody

Each sample was documented in a completed chain of custody and received at the laboratory in good condition.

Overall Assessment

The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision making process. The procedures for assessing the precision, accuracy, representativeness, completeness, and comparability parameters (PARCC) were based on the approved OU-2 RI work plan. The following summary highlights the PARCC findings for the above-defined events:

- Precision of the data was verified through the review of laboratory data quality indicators that include RPDs for laboratory control samples and laboratory control sample duplicates. Precision was generally acceptable, with the exception of naphthalene, which was qualified as estimated in two samples due to field duplicate relative percent difference issues. Data users should consider the impact to any result that is qualified as it may contain a bias that could affect the decision making process.

- Accuracy of the data was verified through the review of the calibration data, laboratory control samples, laboratory control sample duplicates, internal standards, and surrogate standard recoveries, and the evaluation of the method blank, field blank, SUMMA canister, and flow controller data. Accuracy generally was acceptable except for a few analytes that were qualified as not detected because of contamination in the method blank, canister, or flow controller. Data users should consider the impact to any qualified result, as it may contain a bias that could affect the decision-making process.
- Representativeness of the data was verified through sample collection, storage, and verification of holding time compliance. All data were reported from analyses within the USEPA-recommended holding time.
- Comparability of the data was verified through the use of standard USEPA analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are those not rejected for project use. All data were considered valid. The completeness goal of 90 percent was met for all analytes and methods.

Attachment 1
Laboratory Data Packages

ANALYTICAL DATA PACKAGE
SDG # 1312133

PROJECT NAME: ST. LOUIS ORDINANCE PLANT
PROJECT LOCATION: ST. LOUIS, MO
CONTRACT #: 953646

SUBMITTAL TO:
Shane Lowe
CH2M HILL, Inc.
1034 South Brentwood Blvd., Suite 2300
Richmond Heights, MO 63117

SUBMITTAL BY:
Empirical Laboratories, LLC (EL)
621 Mainstream Drive, Suite 270
Nashville, TN 37228
Tel (615)345-1115
Fax (866)417-0548

LABORATORY CONTACT PERSON:
Project Manager: Sonya Gordon
Tel (615)345-1115
Fax (866)417-0548
Email: sgordon@empirlabs.com

Original Report Date: January 7, 2014
Report Revision #: N/A
Revision Date: N/A
Total # of Pages: 61

THIS DOCUMENT MEETS DoD QSM 4.2 STANDARDS

The results relate to only the samples associated with the referenced SDG and the submitted data has been produced in accordance with laboratory procedures. The Laboratory's Technical Lab Director, Mr. Rick Davis, is responsible for the final data produced and reported. His signature is listed at the end of the Case Narrative within the Analytical Data Package. If applicable to this report package, details on report revisions and the information on subcontracted analysis are listed in the package Case Narrative. This report shall not be reproduced, except in full, without the written approval of Empirical Laboratories, LLC.

L-A-B Accredited Certificate Number L2226

Table of Contents

Sample Delivery Group Case Narrative

Receipt Information
The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. There were no subcontracted analyses for this SDG.

Changes to the Revision
This is an original submittal of the final report package.

Analytical Information
All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. Sample prep and dilution information is provided within the final results report and at the beginning of each form set. The following information is provided specific to individual methods:

Chromatographic Flags for Manual Integration:
The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.
B: The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
C: The peak was manually integrated to correct the baseline from the original chromatogram.
D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.
E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

SW8260B:

Note – Samples 1312133-02 and -03 were analyzed at a 20x due to high concentrations of target analytes detected during screening. No lower analyses were able to be performed.

No additional anomalies or deviations are noted.

Data Qualifiers
As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

DL: The detection limit (DL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The DL is supported by the method detection limit (MDL) which is determined from analysis of a sample containing the analyte in a given matrix.

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 4.2 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 4.2 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

*****: Exceeding quality control criteria are associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound. For Metals, the qualifier indicates that the serial dilution was outside of the control limits and the compound should be considered estimated due to the presence of interference.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the LOQ. One should feel confident that the result is greater than zero and less than the LOQ.

M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters DL/LOD/LOQ have been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The relative percent difference (RPD) and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard exceeded criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

LIMS Definitions / Naming Conventions:

The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And "**RE"** implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:
I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, Ms. Marcia K. McGinnity or an approved technical designee is authorized to sign this Statement of Data Authenticity.

Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

Empirical Laboratories, LLC
Certifications/Approvals
(Revised 12/16/2013)

DoD ELAP, Certificate Number L2226
- Aqueous
- Non-aqueous
- Expires: 11/30/2015

State of Florida, Department of Health – NELAP, Lab ID: E87646
- Clean Water Act
- RCRA/CERCLA
- Expires: 06/30/2014

State of Georgia, Environmental Protection Agency – NELAP
- Expires: 06/30/2014

State of Illinois, Environmental Protection Agency – NELAP, Certificate No.: 003300
- Groundwater
- Solid and Hazardous Waste
- Expires: 09/13/2014

State of Kansas Department of Health and Environment – NELAP, Certificate No.: E-10407
- Aqueous
- Non-aqueous
- Expires: 04/30/2014

State of Kentucky Department of Environmental Protection – NELAP, Certificate No.: 77
- Aqueous
- Non-aqueous
- Expires: 06/30/2014

State of Nevada, Department of Conservation and Natural Resources – NELAP, Certificate No.: TN000042013-1
- Aqueous
- Non-aqueous
- Expires: 07/31/2014

State of New Jersey Department of Environmental Protection – NELAP, Lab ID: TN473
- Water Pollution
- Solid and Hazardous Waste
- Expires: 06/30/2014

State of North Carolina, Department of Environment and Natural Resources - Certificate No.: 643
- Aqueous
- Non-aqueous
- Expires: 12/31/2014

State of North Dakota, Department of Health – NELAP, Certificate No.: R-204
- Aqueous
- Non-aqueous
- Expires: 06/30/2014

State of Texas, Commission on Environmental Quality – NELAP, Certificate No.: T104704307-13-8
- Aqueous
- Non-aqueous
- Expires: 12/31/2013

State of Utah, Department of Health – NELAP, Certificate No.: TN0042013-5
- Aqueous
- Non-aqueous
- Expires: 07/31/2014

Commonwealth of Virginia, Department of General Services – VELAP, Certificate No.: 2558 – Lab ID: 460243
- Aqueous
- Non-aqueous
- Expires: 12/14/2014

State of Washington, Department of Ecology – NELAP, Lab ID: C934-13
- Groundwater
- Solid and Hazardous Waste
- Expires: 03/18/2014

ORGANIC CALCULATIONS

GC/MS Volatiles

$$\text{Final Concentration} = \frac{\text{On-column(ug/L or ug/Kg) * Expected Vol/Weight (mL or g) * Dilution}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

Note - Expected Vol/Weight value is found in "Final Vol" column of Preparation Batch Summary.

GC/MS Extractables

$$\text{Final Concentration} = \frac{\text{On-column(ng/uL) * Final Vol (ml) * Dilution *(1000uL/mL)}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

= ng/mL or ng/g

= ug/L or ug/kg

GC or LC Extractables

$$\text{Final Concentration} = \frac{\text{On-column(ng/mL) * Final Vol (mL) * Dilution}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

= ng/mL or ng/g

= ug/L or ug/kg

Sample Receipt Information

1312133

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 877-345-1113 ♦ (fax) 866-417-0548

21:31

Send Results to:	Send Invoice to:
Name Shane Lowe	Name
Company CH2M Hill	Company
Address 1034 S. Brentwood	Address
City St Louis	City
State, Zip MO, 63117	State, Zip
Phone 314.335.3000	Phone
Fax	Fax
E-mail shane.lowe@ch2m.com	E-mail
Project No./Name: 459603 / SLOP OU-2	**Sampler's (Signature):**

Analysis Requirements:

Benzene, Carbon tet., Chloroform, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, Methylene chloride, 1,1,2,2-TeCA, 1,1,1,2-TeCA, Naphthalene, 1,1,2-TCA, PCE, TCE, VC

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
01	12/17/13 0840	MW-114-121713	GW	MS/MSD	9	
02	12/17/13 0845	MW-119-121713			3	
03	12/17/13 0850	FD-01-121713			3	
04	12/17/13 1003	MW-112-121713			3	
05	12/17/13 1005	MW-113-121713			3	
06	12/17/13 1054	MW-106-121713			3	
07	12/17/13 1140	MW-107-121713			3	
08	12/17/13 1343	MW-121-121713			3	
09	12/17/13 1400	MW-107S-121713			3	
10	12/17/13 1440	Trip Blank # 02693			3	

Relinquished by: (Signature)	Date/Time:	Received By: (Signature)
	12/17/13 1600	
Relinquished by: (Signature)	Date/Time:	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time: 0910 12/18/13	*Temperature:* -0.2 int.

REMARKS:

Details:

Page 1 of 1

Cooler No. 1 of 1

Date Shipped 12/17/13

Shipped By TS

Turnaround STD

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

1312133

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

Cooler Received/Opened On: 12/18/13 0910 Workorder# 1312133

1. Tracking # 6277 (last 4 digits, FedEx)

   Courier: FedEx

2. Temperature of rep. sample or temp blank when opened: -0.3 °C + *correction factor (+0.1)* = -0.2 °C

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES (NO) NA

4. Were custody seals on outside of cooler? (YES) NO NA

   If yes, how many and where: 2, front + back

5. Were the seals intact, signed, and dated correctly? (YES) NO NA

6. Were custody papers inside cooler? (YES) NO NA

I certify that I opened the cooler and answered questions 1-6 (initial) JG

7. Were custody seals on containers: YES (NO) and Intact YES NO (NA)

   Were these signed and dated correctly? YES NO (NA)

8. Packing material used? (Bubblewrap) (Plastic bag) Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: (Ice) Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? (YES) NO NA

11. Were all container labels complete (#, date, signed, pres., etc)? (YES) NO NA

12. Did all container labels and tags agree with custody papers? (YES) NO NA

13. a. Were VOA vials received? (YES) NO NA

    b. Was there any observable headspace present in any VOA vial? YES (NO) NA

14. Was there a Trip Blank in this cooler? (YES) NO NA If multiple coolers, sequence # ——

I certify that I unloaded the cooler and answered questions 7-14 (initial) JG

15. a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES NO (NA)

    b. Did the bottle labels indicate that the correct preservatives were used YES NO (NA)

16. Was residual chlorine present? YES NO (NA)

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) JG

17. Were custody papers properly filled out (ink, signed, etc)? (YES) NO NA

18. Did you sign the custody papers in the appropriate place? (YES) NO NA

19. Were correct containers used for the analysis requested? (YES) NO NA

20. Was sufficient amount of sample sent in each container? (YES) NO NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) JG

I certify that I attached a label with the unique LIMS number to each container (initial) JG

I certify that I have performed a second check of the LIMS information against the COC to confirm accuracy (initial) ——

21. Were there Non-Conformance issues at login? YES (NO) Was a NCR generated? YES (NO) #——

Additional Details:

* Only received 2 HCl vials for Trip Blank # 02693 (12/17/13 @ 1440) ; CoC states 3 HCl vials should have been received.

1312133

Empirical Laboratories, LLC

Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Project Manager: Sonya Gordon
Project Number: CH2_SLOP

Report To:
CH2M Hill, Inc.
Shane Lowe
1034 South Brentwood Blvd, Suite 2300
Richmond Heights, MO 63117
Phone: (314) 335-3024
Fax: (314) 421-3927

Invoice To:
CH2M Hill, Inc.
Accounts Payable
P.O.Box 241329
Denver, CO 80224-____
Phone :(303) 771-0952
Fax: (303) 771-0952

Due to Client: 01/13/2014 16:00 *This is the projected due date to the client, at the time of receipt, and is for report delivery via upload, and/or email, and/or shipment to meet TAT as setup by project*

Received By: Joshua T Gross
Date Received: 12/18/2013 09 10
Logged In By: Joshua T Gross
Date Logged In: 12/18/2013 11 37

Samples Received at: **-0.2 C**
Custody Seals Yes Received On Ice Yes
Containers Intact Yes
COC/Labels Agree Yes
Preservation Confirme No

Method	Test Code	Due	TAT	Expires	Comments
1312133-01 MW-114-121713 [Water] Sampled 12/17/2013 08:40 Central 'Client Sample'					**MS/MSD**
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 08:40	MS/MSD low MDLs DIL Approval Required
1312133-02 MW-119-121713 [Water] Sampled 12/17/2013 08:45 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 08:45	low MDLs DIL Approval Required
1312133-03 FD-01-121713 [Water] Sampled 12/17/2013 08:50 Central 'Field Duplicate'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 08:50	low MDLs DIL Approval Required
1312133-04 MW-112-121713 [Water] Sampled 12/17/2013 10:03 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 10:03	low MDLs DIL Approval Required
1312133-05 MW-113-121713 [Water] Sampled 12/17/2013 10:05 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 10:05	low MDLs DIL Approval Required
1312133-06 MW-106-121713 [Water] Sampled 12/17/2013 10:54 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 10:54	low MDLs DIL Approval Required
1312133-07 MW-107-121713 [Water] Sampled 12/17/2013 11:40 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 11:40	low MDLs DIL Approval Required

1312133

Empirical Laboratories, LLC

Client:	**CH2M Hill, Inc.**	**Project Manager:**	**Sonya Gordon**
Project:	**St. Louis Ordnance Plant**	**Project Number:**	**CH2_SLOP**

Method	Test Code	Due	TAT	Expires	Comments
1312133-08 MW-121-121713 [Water] Sampled 12/17/2013 13:43 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 13:43	low MDLs DIL Approval Required
1312133-09 MW-107S-121713 [Water] Sampled 12/17/2013 14:00 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 14:00	low MDLs DIL Approval Required
1312133-10 Trip Blank #02693 [Water] Sampled 12/17/2013 14:40 Central 'Trip Blank'					
SW8260B	VOC_8260B_REG	01/08/2014 14:00	15	12/31/2013 14:40	low MDLs DIL Approval Required

Reviewed By

Date

Sample Delivery Group Assignment Form

CLIENT: CH2M Hill, Inc.
PROJECT NAME: St. Louis Ordnance Plant
SDG #: 1312133

QC LEVEL: Level III
Report Due: 1/13/2014
Client Sample Count: 8

Sample Type	Sampled	Received	Lab ID	Client ID	Report Matrix	SW8260B
Client Sample	12/17/2013	12/18/2013	1312133-01	MW-114-121713	Water	MS/MSD
Client Sample	12/17/2013	12/18/2013	1312133-02	MW-119-121713	Water	X
Field Duplicate	12/17/2013	12/18/2013	1312133-03	FD-01-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-04	MW-112-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-05	MW-113-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-06	MW-106-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-07	MW-107-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-08	MW-121-121713	Water	X
Client Sample	12/17/2013	12/18/2013	1312133-09	MW-107S-121713	Water	X
Trip Blank	12/17/2013	12/18/2013	1312133-10	Trip Blank #02693	Water	X

Data for SW8260B Forms

Sample Extraction Data

Prep Method: 5030B-SW8260B

Lab Number [Field ID]	Batch	Nominal Initial/Final	Initial [mL]	Final [mL]	Dilution	% Solids	Notes	Date
1312133-01 [MW-114-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-02 [MW-119-121713]	3L20009	5 00/5 00	5 00	5 00	20 00			12/20/13
1312133-03 [FD-01-121713]	3L20009	5 00/5 00	5 00	5 00	20 00			12/20/13
1312133-04 [MW-112-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-05 [MW-113-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-06 [MW-106-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-07 [MW-107-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-08 [MW-121-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-09 [MW-107S-121713]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13
1312133-10 [Trip Blank #02693]	3L20009	5 00/5 00	5 00	5 00	1 00			12/20/13

ANALYSIS DATA SHEET

MW-114-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-01 File ID: 1213301.D

Sampled: 12/17/13 08:40 Prepared: 12/20/13 11:25 Analyzed: 12/20/13 11:25

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.190**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.10	97.0	75 - 120	
Dibromofluoromethane	30.00	29.60	98.7	85 - 115	
1,2-Dichloroethane-d4	30.00	29.36	97.9	70 - 120	
Toluene-d8	30.00	31.16	104	85 - 120	

ANALYSIS DATA SHEET

MW-119-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-02 File ID: 1213302D.D

Sampled: 12/17/13 08:45 Prepared: 12/20/13 17:23 Analyzed: 12/20/13 17:23

Solids: Preparation: 5030B Dilution: 20

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**3.60**	3.00	10.0	20.0	JD
56-23-5	Carbon tetrachloride		3.40	10.0	20.0	U
67-66-3	Chloroform		3.40	10.0	20.0	U
107-06-2	1,2-Dichloroethane		3.20	10.0	20.0	U
156-59-2	cis-1,2-Dichloroethene	**2110**	2.80	10.0	20.0	D
156-60-5	trans-1,2-Dichloroethene		4.40	10.0	20.0	U
75-09-2	Methylene chloride		2.40	20.0	40.0	U
91-20-3	Naphthalene		3.20	10.0	20.0	U
79-34-5	1,1,2,2-Tetrachloroethane		2.80	10.0	20.0	U
630-20-6	1,1,1,2-Tetrachloroethane		3.00	10.0	20.0	U
127-18-4	Tetrachloroethene	**691**	4.60	10.0	20.0	D
79-00-5	1,1,2-Trichloroethane		4.00	10.0	20.0	U
79-01-6	Trichloroethene	**141**	3.80	10.0	20.0	D
75-01-4	Vinyl chloride	**5.20**	2.80	10.0	20.0	JD

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.41	98.0	75 - 120	
Dibromofluoromethane	30.00	31.17	104	85 - 115	
1,2-Dichloroethane-d4	30.00	31.08	104	70 - 120	
Toluene-d8	30.00	30.41	101	85 - 120	

ANALYSIS DATA SHEET

FD-01-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-03 File ID: 1213303D.D

Sampled: 12/17/13 08:50 Prepared: 12/20/13 17:51 Analyzed: 12/20/13 17:51

Solids: Preparation: 5030B Dilution: 20

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**3.60**	3.00	10.0	20.0	JD
56-23-5	Carbon tetrachloride		3.40	10.0	20.0	U
67-66-3	Chloroform		3.40	10.0	20.0	U
107-06-2	1,2-Dichloroethane		3.20	10.0	20.0	U
156-59-2	cis-1,2-Dichloroethene	**2310**	2.80	10.0	20.0	D
156-60-5	trans-1,2-Dichloroethene		4.40	10.0	20.0	U
75-09-2	Methylene chloride		2.40	20.0	40.0	U
91-20-3	Naphthalene		3.20	10.0	20.0	U
79-34-5	1,1,2,2-Tetrachloroethane		2.80	10.0	20.0	U
630-20-6	1,1,1,2-Tetrachloroethane		3.00	10.0	20.0	U
127-18-4	Tetrachloroethene	**1070**	4.60	10.0	20.0	D
79-00-5	1,1,2-Trichloroethane		4.00	10.0	20.0	U
79-01-6	Trichloroethene	**195**	3.80	10.0	20.0	D
75-01-4	Vinyl chloride	**5.40**	2.80	10.0	20.0	JD

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.20	97.3	75 - 120	
Dibromofluoromethane	30.00	31.24	104	85 - 115	
1,2-Dichloroethane-d4	30.00	31.18	104	70 - 120	
Toluene-d8	30.00	30.25	101	85 - 120	

ANALYSIS DATA SHEET

MW-112-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-04 File ID: 1213304.D

Sampled: 12/17/13 10:03 Prepared: 12/20/13 11:52 Analyzed: 12/20/13 11:52

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.250**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.04	96.8	75 - 120	
Dibromofluoromethane	30.00	30.01	100	85 - 115	
1,2-Dichloroethane-d4	30.00	30.19	101	70 - 120	
Toluene-d8	30.00	30.17	101	85 - 120	

ANALYSIS DATA SHEET

MW-113-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-05 File ID: 1213305.D

Sampled: 12/17/13 10:05 Prepared: 12/20/13 12:20 Analyzed: 12/20/13 12:20

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.410**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene	**3.81**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene	**0.280**	0.190	0.500	1.00	J
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.37	97.9	75 - 120	
Dibromofluoromethane	30.00	30.24	101	85 - 115	
1,2-Dichloroethane-d4	30.00	30.48	102	70 - 120	
Toluene-d8	30.00	30.47	102	85 - 120	

ANALYSIS DATA SHEET

MW-106-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-06 File ID: 1213306.D

Sampled: 12/17/13 10:54 Prepared: 12/20/13 12:48 Analyzed: 12/20/13 12:48

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane	**69.0**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.240**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.66	95.5	75 - 120	
Dibromofluoromethane	30.00	30.22	101	85 - 115	
1,2-Dichloroethane-d4	30.00	30.03	100	70 - 120	
Toluene-d8	30.00	30.68	102	85 - 120	

ANALYSIS DATA SHEET

MW-107-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-07 File ID: 1213307.D

Sampled: 12/17/13 11:40 Prepared: 12/20/13 13:15 Analyzed: 12/20/13 13:15

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane	**24.0**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**0.910**	0.140	0.500	1.00	J
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.310**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene	**0.820**	0.190	0.500	1.00	J
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	30.98	103	75 - 120	
Dibromofluoromethane	30.00	30.30	101	85 - 115	
1,2-Dichloroethane-d4	30.00	30.18	101	70 - 120	
Toluene-d8	30.00	32.44	108	85 - 120	

ANALYSIS DATA SHEET

MW-121-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-08 File ID: 1213308.D

Sampled: 12/17/13 13:43 Prepared: 12/20/13 13:43 Analyzed: 12/20/13 13:43

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride	**0.530**	0.170	0.500	1.00	J
67-66-3	Chloroform	**1.44**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.230**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.96	96.5	75 - 120	
Dibromofluoromethane	30.00	30.43	101	85 - 115	
1,2-Dichloroethane-d4	30.00	30.27	101	70 - 120	
Toluene-d8	30.00	30.24	101	85 - 120	

ANALYSIS DATA SHEET

MW-107S-121713

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-09 File ID: 1213309.D

Sampled: 12/17/13 14:00 Prepared: 12/20/13 14:10 Analyzed: 12/20/13 14:10

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform	**0.300**	0.170	0.500	1.00	J
107-06-2	1,2-Dichloroethane	**1.13**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**15.1**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**0.310**	0.220	0.500	1.00	J
75-09-2	Methylene chloride	**0.170**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene	**0.580**	0.230	0.500	1.00	J
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene	**4.91**	0.190	0.500	1.00	
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.08	96.9	75 - 120	
Dibromofluoromethane	30.00	30.27	101	85 - 115	
1,2-Dichloroethane-d4	30.00	29.93	99.8	70 - 120	
Toluene-d8	30.00	30.61	102	85 - 120	

ANALYSIS DATA SHEET

Trip Blank #02693

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312133-10 File ID: 1213310.D

Sampled: 12/17/13 14:40 Prepared: 12/20/13 10:30 Analyzed: 12/20/13 10:30

Solids: Preparation: 5030B Dilution: 1

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.62	98.7	75 - 120	
Dibromofluoromethane	30.00	30.15	100	85 - 115	
1,2-Dichloroethane-d4	30.00	29.94	99.8	70 - 120	
Toluene-d8	30.00	31.21	104	85 - 120	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L35802
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (3L35802-CCV1) ug/L				Lab File ID: 1220CCV1.D		Analyzed: 12/20/13 07:42		
Bromofluorobenzene	30.00	102	80 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	97.9	80 - 120	6.74	6.74	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	100	80 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	102	80 - 120	9.45	9.45	0.0000	+/-1.000	
LCS (3L20009-BS1) ug/L				Lab File ID: 1220LCS1.D		Analyzed: 12/20/13 08:12		
Bromofluorobenzene	30.00	98.6	75 - 120	12.05	12.06	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	97.8	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	102	70 - 120	7.24	7.23	0.0100	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.44	9.45	-0.0100	+/-1.000	
Blank (3L20009-BLK1) ug/L				Lab File ID: 1220BLK1.D		Analyzed: 12/20/13 10:02		
Bromofluorobenzene	30.00	97.2	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	97.8	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	100	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	103	85 - 120	9.45	9.45	0.0000	+/-1.000	
Trip Blank #02693 (1312133-10) ug/L				Lab File ID: 1213310.D		Analyzed: 12/20/13 10:30		
Bromofluorobenzene	30.00	98.7	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	100	85 - 115	6.74	6.74	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	99.8	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	104	85 - 120	9.45	9.45	0.0000	+/-1.000	
MW-114-121713 (1312133-01) ug/L				Lab File ID: 1213301.D		Analyzed: 12/20/13 11:25		
Bromofluorobenzene	30.00	97.0	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	98.7	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	97.9	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	104	85 - 120	9.45	9.45	0.0000	+/-1.000	
MW-112-121713 (1312133-04) ug/L				Lab File ID: 1213304.D		Analyzed: 12/20/13 11:52		
Bromofluorobenzene	30.00	96.8	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	100	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.45	9.45	0.0000	+/-1.000	
MW-113-121713 (1312133-05) ug/L				Lab File ID: 1213305.D		Analyzed: 12/20/13 12:20		
Bromofluorobenzene	30.00	97.9	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.74	6.74	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	102	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	102	85 - 120	9.45	9.45	0.0000	+/-1.000	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L35802
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
MW-106-121713 (1312133-06) ug/L				Lab File ID: 1213306.D		Analyzed: 12/20/13 12:48		
Bromofluorobenzene	30.00	95.5	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.74	6.74	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	100	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	102	85 - 120	9.44	9.45	-0.0100	+/-1.000	
MW-107-121713 (1312133-07) ug/L				Lab File ID: 1213307.D		Analyzed: 12/20/13 13:15		
Bromofluorobenzene	30.00	103	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	108	85 - 120	9.45	9.45	0.0000	+/-1.000	
MW-121-121713 (1312133-08) ug/L				Lab File ID: 1213308.D		Analyzed: 12/20/13 13:43		
Bromofluorobenzene	30.00	96.5	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.74	6.74	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.45	9.45	0.0000	+/-1.000	
MW-107S-121713 (1312133-09) ug/L				Lab File ID: 1213309.D		Analyzed: 12/20/13 14:10		
Bromofluorobenzene	30.00	96.9	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	99.8	70 - 120	7.24	7.23	0.0100	+/-1.000	
Toluene-d8	30.00	102	85 - 120	9.44	9.45	-0.0100	+/-1.000	
MW-119-121713 (1312133-02) ug/L				Lab File ID: 1213302D.D		Analyzed: 12/20/13 17:23		
Bromofluorobenzene	30.00	98.0	75 - 120	12.05	12.06	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	104	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	104	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.44	9.45	-0.0100	+/-1.000	
FD-01-121713 (1312133-03) ug/L				Lab File ID: 1213303D.D		Analyzed: 12/20/13 17:51		
Bromofluorobenzene	30.00	97.3	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	104	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	104	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.45	9.45	0.0000	+/-1.000	
Matrix Spike (3L20009-MS1) ug/L				Lab File ID: 1213301M.D		Analyzed: 12/20/13 18:18		
Bromofluorobenzene	30.00	102	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	102	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.45	9.45	0.0000	+/-1.000	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L35802
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Matrix Spike Dup (3L20009-MSD1) ug/L				Lab File ID: 1213301S.D		Analyzed: 12/20/13 18:46		
Bromofluorobenzene	30.00	104	75 - 120	12.06	12.06	0.0000	+/-1.000	
Dibromofluoromethane	30.00	100	85 - 115	6.73	6.74	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	96.4	70 - 120	7.23	7.23	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.45	9.45	0.0000	+/-1.000	

LCS / LCS DUPLICATE RECOVERY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Matrix: Water
Batch: 3L20009
Laboratory ID: 3L20009-BS1
Preparation: 5030B
Initial/Final: 5 mL / 5 mL

ANALYTE	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC.	QC LIMITS REC.
Benzene	50.00	50.0	100	80 - 120
Carbon tetrachloride	50.00	44.6	89.2	65 - 140
Chloroform	50.00	42.4	84.7	65 - 135
1,2-Dichloroethane	50.00	44.9	89.8	70 - 130
cis-1,2-Dichloroethene	50.00	50.7	101	70 - 125
trans-1,2-Dichloroethene	50.00	49.3	98.6	60 - 140
Methylene chloride	50.00	43.5	87.0	55 - 140
Naphthalene	50.00	47.4	94.9	55 - 140
1,1,2,2-Tetrachloroethane	50.00	49.0	97.9	65 - 130
1,1,1,2-Tetrachloroethane	50.00	49.2	98.5	80 - 130
Tetrachloroethene	50.00	43.6	87.3	45 - 150
1,1,2-Trichloroethane	50.00	51.7	103	75 - 125
Trichloroethene	50.00	49.0	97.9	70 - 125
Vinyl chloride	50.00	61.2	122	50 - 145

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8260B

MW-114-121713

Laboratory: Empirical Laboratories, LLC

SDG: 1312133

Client: CH2M Hill, Inc.

Project: St. Louis Ordnance Plant

Matrix: Water

Batch: 3L20009

% Solids:

Source Sample Name: **1312133-01**

ANALYTE	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC.	Q	QC LIMITS REC.
Benzene	50.00	ND	47.0	94.0		80 - 120
Carbon tetrachloride	50.00	ND	48.0	96.1		65 - 140
Chloroform	50.00	ND	46.5	93.1		65 - 135
1,2-Dichloroethane	50.00	ND	48.9	97.7		70 - 130
cis-1,2-Dichloroethene	50.00	ND	49.5	98.9		70 - 125
trans-1,2-Dichloroethene	50.00	ND	46.6	93.3		60 - 140
Methylene chloride	50.00	0.190	42.7	85.1		55 - 140
Naphthalene	50.00	ND	45.4	90.8		55 - 140
1,1,2,2-Tetrachloroethane	50.00	ND	48.1	96.2		65 - 130
1,1,1,2-Tetrachloroethane	50.00	ND	49.3	98.6		80 - 130
Tetrachloroethene	50.00	ND	44.8	89.7		45 - 150
1,1,2-Trichloroethane	50.00	ND	49.6	99.3		75 - 125
Trichloroethene	50.00	ND	47.5	95.1		70 - 125
Vinyl chloride	50.00	ND	42.7	85.5		50 - 145

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8260B

MW-114-121713

Laboratory: Empirical Laboratories, LLC

SDG: 1312133

Client: CH2M Hill, Inc.

Project: St. Louis Ordnance Plant

Matrix: Water

Batch: 3L20009

% Solids:

Source Sample Name: **1312133-01**

ANALYTE	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Benzene	50.00	50.0	99.9	6.04		30	80 - 120
Carbon tetrachloride	50.00	50.5	101	4.95		30	65 - 140
Chloroform	50.00	47.9	95.8	2.88		30	65 - 135
1,2-Dichloroethane	50.00	49.2	98.4	0.673		30	70 - 130
cis-1,2-Dichloroethene	50.00	52.1	104	5.26		30	70 - 125
trans-1,2-Dichloroethene	50.00	50.0	99.9	6.87		30	60 - 140
Methylene chloride	50.00	44.7	89.1	4.53		30	55 - 140
Naphthalene	50.00	47.3	94.7	4.21		30	55 - 140
1,1,2,2-Tetrachloroethane	50.00	50.4	101	4.69		30	65 - 130
1,1,1,2-Tetrachloroethane	50.00	50.3	101	2.09		30	80 - 130
Tetrachloroethene	50.00	45.9	91.9	2.42		30	45 - 150
1,1,2-Trichloroethane	50.00	51.5	103	3.72		30	75 - 125
Trichloroethene	50.00	48.7	97.3	2.35		30	70 - 125
Vinyl chloride	50.00	50.8	102	17.3		30	50 - 145

PREPARATION BATCH SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Batch: 3L20009 Batch Matrix: Water Preparation: 5030B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL /WEIGHT	FINAL VOL
MW-114-121713	1312133-01	12/20/13 11:25	5 00	5 00
MW-119-121713	1312133-02	12/20/13 17:23	5 00	5 00
FD-01-121713	1312133-03	12/20/13 17:51	5 00	5 00
MW-112-121713	1312133-04	12/20/13 11:52	5 00	5 00
MW-113-121713	1312133-05	12/20/13 12:20	5 00	5 00
MW-106-121713	1312133-06	12/20/13 12:48	5 00	5 00
MW-107-121713	1312133-07	12/20/13 13:15	5 00	5 00
MW-121-121713	1312133-08	12/20/13 13:43	5 00	5 00
MW-107S-121713	1312133-09	12/20/13 14:10	5 00	5 00
Trip Blank #02693	1312133-10	12/20/13 10:30	5 00	5 00
Blank	3L20009-BLK1	12/20/13 10:02	5 00	5 00
LCS	3L20009-BS1	12/20/13 08:12	5 00	5 00
MW-114-121713	3L20009-MS1	12/20/13 18:18	5 00	5 00
MW-114-121713	3L20009-MSD1	12/20/13 18:46	5 00	5 00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L20009-BLK1 File ID: 1220BLK1.D

Sampled: Prepared: Analyzed: 12/20/13 10:02

Solids: Preparation: 5030B Dilution:

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.16	97.2	75 - 120	
Dibromofluoromethane	30.00	29.35	97.8	85 - 115	
1,2-Dichloroethane-d4	30.00	30.13	100	70 - 120	
Toluene-d8	30.00	31.00	103	85 - 120	

ANALYSIS DATA SHEET

LCS

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L20009-BS1 File ID: 1220LCS1.D

Sampled: Prepared: Analyzed: 12/20/13 08:12

Solids: Preparation: 5030B Dilution:

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**50.0**	0.150	0.500	1.00	
56-23-5	Carbon tetrachloride	**44.6**	0.170	0.500	1.00	
67-66-3	Chloroform	**42.4**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane	**44.9**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**50.7**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**49.3**	0.220	0.500	1.00	
75-09-2	Methylene chloride	**43.5**	0.120	1.00	2.00	
91-20-3	Naphthalene	**47.4**	0.160	0.500	1.00	
79-34-5	1,1,2,2-Tetrachloroethane	**49.0**	0.140	0.500	1.00	
630-20-6	1,1,1,2-Tetrachloroethane	**49.2**	0.150	0.500	1.00	
127-18-4	Tetrachloroethene	**43.6**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane	**51.7**	0.200	0.500	1.00	
79-01-6	Trichloroethene	**49.0**	0.190	0.500	1.00	
75-01-4	Vinyl chloride	**61.2**	0.140	0.500	1.00	

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.59	98.6	75 - 120	
Dibromofluoromethane	30.00	29.35	97.8	85 - 115	
1,2-Dichloroethane-d4	30.00	30.61	102	70 - 120	
Toluene-d8	30.00	30.06	100	85 - 120	

ANALYSIS DATA SHEET

Matrix Spike

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L20009-MS1 File ID: 1213301M.D

Sampled: Prepared: Analyzed: 12/20/13 18:18

Solids: Preparation: 5030B Dilution:

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**47.0**	0.150	0.500	1.00	
56-23-5	Carbon tetrachloride	**48.0**	0.170	0.500	1.00	
67-66-3	Chloroform	**46.5**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane	**48.9**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**49.5**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**46.6**	0.220	0.500	1.00	
75-09-2	Methylene chloride	**42.7**	0.120	1.00	2.00	
91-20-3	Naphthalene	**45.4**	0.160	0.500	1.00	
79-34-5	1,1,2,2-Tetrachloroethane	**48.1**	0.140	0.500	1.00	
630-20-6	1,1,1,2-Tetrachloroethane	**49.3**	0.150	0.500	1.00	
127-18-4	Tetrachloroethene	**44.8**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane	**49.6**	0.200	0.500	1.00	
79-01-6	Trichloroethene	**47.5**	0.190	0.500	1.00	
75-01-4	Vinyl chloride	**42.7**	0.140	0.500	1.00	

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	30.63	102	75 - 120	
Dibromofluoromethane	30.00	30.50	102	85 - 115	
1,2-Dichloroethane-d4	30.00	30.20	101	70 - 120	
Toluene-d8	30.00	30.19	101	85 - 120	

ANALYSIS DATA SHEET

Matrix Spike Dup

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L20009-MSD1 File ID: 1213301S.D

Sampled: Prepared: Analyzed: 12/20/13 18:46

Solids: Preparation: 5030B Dilution:

Batch: 3L20009 Sequence: 3L35802 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**50.0**	0.150	0.500	1.00	
56-23-5	Carbon tetrachloride	**50.5**	0.170	0.500	1.00	
67-66-3	Chloroform	**47.9**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane	**49.2**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**52.1**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**50.0**	0.220	0.500	1.00	
75-09-2	Methylene chloride	**44.7**	0.120	1.00	2.00	
91-20-3	Naphthalene	**47.3**	0.160	0.500	1.00	
79-34-5	1,1,2,2-Tetrachloroethane	**50.4**	0.140	0.500	1.00	
630-20-6	1,1,1,2-Tetrachloroethane	**50.3**	0.150	0.500	1.00	
127-18-4	Tetrachloroethene	**45.9**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane	**51.5**	0.200	0.500	1.00	
79-01-6	Trichloroethene	**48.7**	0.190	0.500	1.00	
75-01-4	Vinyl chloride	**50.8**	0.140	0.500	1.00	

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	31.25	104	75 - 120	
Dibromofluoromethane	30.00	30.13	100	85 - 115	
1,2-Dichloroethane-d4	30.00	28.92	96.4	70 - 120	
Toluene-d8	30.00	30.18	101	85 - 120	

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Lab File ID:	1216TUN1.D	Injection Date:	12/16/13
Instrument ID:	MS-VOA6	Injection Time:	06:17
Sequence:	3L35205	Lab Sample ID:	3L35205-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	28	PASS
75	30 - 60% of 95	57.3	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.48	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	75.9	PASS
175	5 - 9% of 174	7.36	PASS
176	95 - 101% of 174	97.5	PASS
177	5 - 9% of 176	6.33	PASS

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Lab File ID:	1220TUN1.D	Injection Date:	12/20/13
Instrument ID:	MS-VOA6	Injection Time:	07:15
Sequence:	3L35802	Lab Sample ID:	3L35802-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	29.6	PASS
75	30 - 60% of 95	57.6	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.23	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	69.8	PASS
175	5 - 9% of 174	7.66	PASS
176	95 - 101% of 174	98.1	PASS
177	5 - 9% of 176	6.4	PASS

ANALYSIS SEQUENCE SUMMARY

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L35205	Instrument:	MS-VOA6
Calibration:	3352001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	3L35205-TUN1	1216TUN1.D	12/16/13 06:17
Cal Standard	3L35205-CAL1	1216CAL1.D	12/16/13 07:39
Cal Standard	3L35205-CAL2	1216CAL2.D	12/16/13 08:07
Cal Standard	3L35205-CAL3	1216CAL3.D	12/16/13 08:35
Cal Standard	3L35205-CAL4	1216CAL4.D	12/16/13 09:02
Cal Standard	3L35205-CAL5	1216CAL5.D	12/16/13 09:30
Cal Standard	3L35205-CAL6	1216CAL6.D	12/16/13 09:57
Cal Standard	3L35205-CAL7	1216CAL7.D	12/16/13 10:25
Cal Standard	3L35205-CAL8	1216CAL8.D	12/16/13 10:52
Cal Standard	3L35205-CAL9	1216CAL9.D	12/16/13 11:20
Initial Cal Check	3L35205-ICV1	1216ICV1.D	12/16/13 12:15

ANALYSIS SEQUENCE SUMMARY

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L35802	Instrument:	MS-VOA6
Calibration:	3352001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	3L35802-TUN1	1220TUN1.D	12/20/13 07:15
Calibration Check	3L35802-CCV1	1220CCV1.D	12/20/13 07:42
LCS	3L20009-BS1	1220LCS1.D	12/20/13 08:12
Blank	3L20009-BLK1	1220BLK1.D	12/20/13 10:02
Trip Blank #02693	1312133-10	1213310.D	12/20/13 10:30
MW-114-121713	1312133-01	1213301.D	12/20/13 11:25
MW-112-121713	1312133-04	1213304.D	12/20/13 11:52
MW-113-121713	1312133-05	1213305.D	12/20/13 12:20
MW-106-121713	1312133-06	1213306.D	12/20/13 12:48
MW-107-121713	1312133-07	1213307.D	12/20/13 13:15
MW-121-121713	1312133-08	1213308.D	12/20/13 13:43
MW-107S-121713	1312133-09	1213309.D	12/20/13 14:10
MW-119-121713	1312133-02	1213302D.D	12/20/13 17:23
FD-01-121713	1312133-03	1213303D.D	12/20/13 17:51
MW-114-121713	3L20009-MS1	1213301M.D	12/20/13 18:18
MW-114-121713	3L20009-MSD1	1213301S.D	12/20/13 18:46

INTERNAL STANDARD AREA AND RT SUMMARY
SW8260B

Laboratory: Empirical Laboratories, LLC
Client: CH2M Hill, Inc.
Sequence: 3L35802
SDG: 1312133
Project: St. Louis Ordnance Plant
Instrument: MS-VOA6
Calibration: 3352001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (3L35802-CCV1)			Lab File ID: 1220CCV1.D			Analyzed: 12/20/13 07:42			
Fluorobenzene	1092879	7.76	985038	7.76	111	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	499905	10.87	457662	10.87	109	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	446895	13.26	401927	13.25	111	50 - 200	0.0100	+/-0.50	
LCS (3L20009-BS1)			Lab File ID: 1220LCS1.D			Analyzed: 12/20/13 08:12			
Fluorobenzene	1115111	7.76	985038	7.76	113	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	512286	10.87	457662	10.87	112	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	452763	13.26	401927	13.26	113	50 - 200	0.0000	+/-0.50	
Blank (3L20009-BLK1)			Lab File ID: 1220BLK1.D			Analyzed: 12/20/13 10:02			
Fluorobenzene	945651	7.75	985038	7.76	96	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	420520	10.87	457662	10.87	92	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	339960	13.25	401927	13.26	85	50 - 200	-0.0100	+/-0.50	
Trip Blank #02693 (1312133-10)			Lab File ID: 1213310.D			Analyzed: 12/20/13 10:30			
Fluorobenzene	944356	7.75	985038	7.76	96	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	416615	10.87	457662	10.87	91	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	338877	13.25	401927	13.26	84	50 - 200	-0.0100	+/-0.50	
MW-114-121713 (1312133-01)			Lab File ID: 1213301.D			Analyzed: 12/20/13 11:25			
Fluorobenzene	927000	7.75	985038	7.76	94	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	409528	10.87	457662	10.87	89	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	325281	13.25	401927	13.26	81	50 - 200	-0.0100	+/-0.50	
MW-112-121713 (1312133-04)			Lab File ID: 1213304.D			Analyzed: 12/20/13 11:52			
Fluorobenzene	907573	7.75	985038	7.76	92	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	406567	10.87	457662	10.87	89	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	324611	13.25	401927	13.26	81	50 - 200	-0.0100	+/-0.50	
MW-113-121713 (1312133-05)			Lab File ID: 1213305.D			Analyzed: 12/20/13 12:20			
Fluorobenzene	897769	7.75	985038	7.76	91	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	404756	10.87	457662	10.87	88	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	320182	13.25	401927	13.26	80	50 - 200	-0.0100	+/-0.50	
MW-106-121713 (1312133-06)			Lab File ID: 1213306.D			Analyzed: 12/20/13 12:48			
Fluorobenzene	893065	7.76	985038	7.76	91	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	401563	10.87	457662	10.87	88	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	319225	13.26	401927	13.26	79	50 - 200	0.0000	+/-0.50	
MW-107-121713 (1312133-07)			Lab File ID: 1213307.D			Analyzed: 12/20/13 13:15			
Fluorobenzene	884835	7.76	985038	7.76	90	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	379598	10.87	457662	10.87	83	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	319664	13.25	401927	13.26	80	50 - 200	-0.0100	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L35802
Instrument: MS-VOA6
Calibration: 3352001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-121-121713 (1312133-08)			Lab File ID: 1213308.D			Analyzed: 12/20/13 13:43			
Fluorobenzene	884824	7.76	985038	7.76	90	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	399583	10.87	457662	10.87	87	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	322731	13.26	401927	13.26	80	50 - 200	0.0000	+/-0.50	
MW-107S-121713 (1312133-09)			Lab File ID: 1213309.D			Analyzed: 12/20/13 14:10			
Fluorobenzene	886760	7.76	985038	7.76	90	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	393993	10.87	457662	10.87	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	317332	13.26	401927	13.26	79	50 - 200	0.0000	+/-0.50	
MW-119-121713 (1312133-02)			Lab File ID: 1213302D.D			Analyzed: 12/20/13 17:23			
Fluorobenzene	839560	7.76	985038	7.76	85	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	381250	10.86	457662	10.87	83	50 - 200	-0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	298207	13.26	401927	13.26	74	50 - 200	0.0000	+/-0.50	
FD-01-121713 (1312133-03)			Lab File ID: 1213303D.D			Analyzed: 12/20/13 17:51			
Fluorobenzene	837239	7.75	985038	7.76	85	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	383095	10.87	457662	10.87	84	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	301449	13.25	401927	13.26	75	50 - 200	-0.0100	+/-0.50	
Matrix Spike (3L20009-MS1)			Lab File ID: 1213301M.D			Analyzed: 12/20/13 18:18			
Fluorobenzene	928192	7.75	985038	7.76	94	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	428148	10.87	457662	10.87	94	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	377807	13.25	401927	13.26	94	50 - 200	-0.0100	+/-0.50	
Matrix Spike Dup (3L20009-MSD1)			Lab File ID: 1213301S.D			Analyzed: 12/20/13 18:46			
Fluorobenzene	962807	7.75	985038	7.76	98	50 - 200	-0.0100	+/-0.50	
Chlorobenzene-d5	444049	10.87	457662	10.87	97	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	396729	13.25	401927	13.26	99	50 - 200	-0.0100	+/-0.50	

Note: As indicated by QSM 4.2 table F-4, internal standard retention times are evaluated to the continuing calibration verification rather than the midpoint of the initial calibration curve. Reference DoD QSM F-4 tables for RTW establishment: "Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used." and the following page for technical explanation on the use of daily CCV retention times in lieu of the ICAL midpoint standard: "Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (such as column clipping).

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Acetone	1	~~0.3288185~~	2	0.2220273	4	0.1623286	10	0.1481551	20	0.1274897	100	0.1233507
Acetonitrile	5	5.602495E-02	10	4.919139E-02	20	3.879023E-02	50	4.228191E-02	100	3.906914E-02	500	3.957251E-02
Acrolein	2.5	~~5.492273E-02~~	5	3.727502E-02	10	3.186782E-02	25	0.0315535	50	3.491343E-02	250	3.657385E-02
Acrylonitrile	2.5	0.1327456	5	0.1091826	10	0.10551	25	0.1111542	50	0.1039141	250	0.104849
Benzene	0.5	1.001792	1	0.8997419	2	0.9567685	5	0.9800019	10	0.9857401	50	1.041908
Allyl chloride	0.5	0.1290039	1	0.1213898	2	0.1221582	5	0.1235948	10	0.1223193	50	0.1312837
Bromobenzene	0.5	0.8259444	1	0.71856	2	0.7825523	5	0.8274245	10	0.7849139	50	0.8543822
Bromochloromethane	0.5	0.1729479	1	0.1412803	2	0.1584977	5	0.1602483	10	0.1606515	50	0.1742235
Tert-Amyl Methyl Ether	0.5	0.7530665	1	0.6342354	2	0.6689521	5	0.751513	10	0.7494703	50	0.8221681
Bromodichloromethane	0.5	0.4455311	1	0.4058173	2	0.4182092	5	0.4424072	10	0.4469204	50	0.4848844
Bromoform	0.5	0.2992146	1	0.2922096	2	0.3315837	5	0.3806187	10	0.3749049	50	0.4651812
Bromomethane	0.5	0.3337857	1	0.2620238	2	0.2305324	5	0.2638356	10	0.2480899	50	0.237613
Bromofluorobenzene	30	0.9571981	35	0.9655349	40	0.9710133	50	0.982005	60	0.9884479	70	0.9764452
n-Butylbenzene	0.5	1.63077	1	1.530071	2	1.623714	5	1.842372	10	1.927617	50	2.194212
2-Butanone	1	0.1769362	2	0.1475096	4	0.150836	10	0.1426553	20	0.1441023	100	0.148134
sec-Butylbenzene	0.5	2.636033	1	2.256345	2	2.503791	5	2.75357	10	2.930176	50	3.220494
tert-Butylbenzene	0.5	2.127834	1	1.88197	2	2.156601	5	2.359505	10	2.423421	50	2.655347
Carbon disulfide	0.5	0.8624913	1	0.6883061	2	0.764688	5	0.8074891	10	0.8392042	50	0.9107136
Carbon tetrachloride	0.5	0.4284176	1	0.4257079	2	0.4556586	5	0.4740362	10	0.4678455	50	0.5254643
Chlorobenzene	0.5	1.836998	1	1.53932	2	1.674058	5	1.728988	10	1.653791	50	1.774433
Chloroethane	0.5	0.2242158	1	0.1822821	2	0.1660879	5	0.1958606	10	0.1872501	50	0.1878772
Chloroform	0.5	0.7843929	1	0.5799134	2	0.5963625	5	0.6112162	10	0.5784279	50	0.612751
2-Chloroethyl vinyl ether	1	8.099906E-02	2	7.333291E-02	4	8.531739E-02	10	8.280067E-02	20	7.014801E-02	100	7.348515E-02
Chloromethane	0.5	0.4477065	1	0.3323947	2	0.313451	5	0.3592467	10	0.3601449	50	0.3735497
1-Chlorohexane	0.5	0.9288087	1	0.7096853	2	0.6703928	5	0.7042292	10	0.6803893	50	0.7401774
2-Chlorotoluene	0.5	2.297746	1	2.004349	2	2.363496	5	2.400817	10	2.368955	50	2.535951
Chloroprene	0.5	0.6499504	1	0.5868428	2	0.5701908	5	0.6287847	10	0.6589835	50	0.6944669
4-Chlorotoluene	0.5	2.833016	1	2.302249	2	2.627214	5	2.782515	10	2.804322	50	2.97795
Cyclohexane	0.5	0.4220363	1	0.3535059	2	0.3953851	5	0.4415826	10	0.4476266	50	0.4864473
Dibromochloromethane	0.5	0.7035714	1	0.5561912	2	0.6191473	5	0.6766387	10	0.7061886	50	0.7994532
1,2-Dibromo-3-chloropropane	0.5	~~0.1332416~~	1	7.209409E-02	2	0.1074893	5	0.126289	10	0.1173174	50	0.1521664

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
1,2-Dibromoethane (EDB)	0.5	0.6341586	1	0.5156088	2	0.5772478	5	0.6427509	10	0.6161028	50	0.6577304
Dibromomethane	0.5	0.2421995	1	0.1854057	2	0.2130608	5	0.2190477	10	0.2085717	50	0.2175011
1,2-Dichlorobenzene	0.5	1.407292	1	1.184648	2	1.351536	5	1.422387	10	1.369617	50	1.513227
1,3-Dichlorobenzene	0.5	1.428795	1	1.432168	2	1.427206	5	1.480065	10	1.499029	50	1.567131
trans-1,4-Dichloro-2-butene	0.5	~~0.2676352~~	1	0.2518055	2	0.3127859	5	0.3502759	10	0.3212036	50	0.3811003
cis-1,4-Dichloro-2-butene	0.5	0.3198566	1	0.3155188	2	0.3168749	5	0.3477989	10	0.3507495	50	0.4043255
1,4-Dichlorobenzene	0.5	1.707374	1	1.367026	2	1.454231	5	1.524296	10	1.519416	50	1.597998
Dichlorodifluoromethane	0.5	0.4704762	1	0.3875424	2	0.3951523	5	0.3825526	10	0.4779366	50	0.4882398
1,1-Dichloroethane	0.5	0.6215971	1	0.5148204	2	0.5539186	5	0.5739058	10	0.5604445	50	0.5789404
1,2-Dichloroethane	0.5	0.6977377	1	0.6492072	2	0.7149046	5	0.7101144	10	0.67133	50	0.691011
1,1-Dichloroethene	0.5	0.2675797	1	0.2221709	2	0.2395009	5	0.2447506	10	0.2557957	50	0.2570837
cis-1,2-Dichloroethene	0.5	0.2432872	1	0.2485959	2	0.2681966	5	0.2855692	10	0.2791828	50	0.2906336
trans-1,2-Dichloroethene	0.5	0.2581528	1	0.2446824	2	0.2374065	5	0.263039	10	0.2572849	50	0.2639993
1,2-Dichloroethene (total)	1	0.25072	2	0.2466391	4	0.2528015	10	0.2743041	20	0.2682338	100	0.2773164
1,2-Dichloropropane	0.5	0.266347	1	0.2328701	2	0.2608034	5	0.2741643	10	0.267286	50	0.2905274
1,3-Dichloropropane	0.5	0.8342121	1	0.8839789	2	0.9185308	5	0.9486775	10	0.9342751	50	0.9912243
2,2-Dichloropropane	0.5	0.4529276	1	0.4296573	2	0.4538864	5	0.489089	10	0.4749316	50	0.5172111
1,1-Dichloropropene	0.5	0.4012245	1	0.3583529	2	0.392503	5	0.4229588	10	0.424626	50	0.4528363
cis-1,3-Dichloropropene	0.5	0.359601	1	0.3314971	2	0.3875622	5	0.4071793	10	0.4238631	50	0.477862
trans-1,3-Dichloropropene	0.5	0.8971715	1	0.7819362	2	0.9491996	5	0.9869749	10	0.9862184	50	1.126627
Diisopropyl Ether	0.5	1.024054	1	0.9017525	2	0.9641796	5	1.040038	10	1.039067	50	1.112964
1,4-Dioxane	10	2.008661E-03	20	2.044705E-03	40	2.336114E-03	100	2.522071E-03	200	2.143985E-03	1000	2.652047E-03
Ethylbenzene	0.5	2.471944	1	2.214522	2	2.434572	5	2.684476	10	2.758637	50	2.957095
Ethyl tert-Butyl Ether	0.5	0.963577	1	0.8655258	2	0.9727006	5	1.049249	10	1.01616	50	1.116396
Ethyl Methacrylate	0.5	0.6280201	1	0.5561912	2	0.639135	5	0.7033684	10	0.696696	50	0.7859386
Hexachlorobutadiene	0.5	0.5563893	1	0.5156109	2	0.5323706	5	0.5419032	10	0.5247702	50	0.5732651
Hexane	0.5	0.2049994	1	0.196464	2	0.2098027	5	0.2321438	10	0.2439422	50	0.2540686
2-Hexanone	1	0.3953851	2	0.3723189	4	0.3950613	10	0.4464009	20	0.428934	100	0.463153
Iodomethane	0.5	0.3519145	1	0.3424476	2	0.3514375	5	0.3883598	10	0.4235499	50	0.4924456
Isobutyl alcohol	10	6.261655E-03	20	4.24918E-03	40	5.220006E-03	100	5.682173E-03	200	4.898134E-03	1000	5.645641E-03
Isopropylbenzene	0.5	~~2.013914~~	1	1.823319	2	2.181329	5	2.425183	10	2.470393	50	2.749678

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
p-Isopropyltoluene	0.5	2.414284	1	2.089967	2	2.245291	5	2.501381	10	2.570049	50	2.827357
Methacrylonitrile	5	0.22497	10	0.1930065	20	0.2089327	50	0.2237446	100	0.2139761	500	0.2226564
Methylene chloride	0.5	~~0.5828017~~	1	0.3491975	2	0.3288461	5	0.3273941	10	0.2845865	50	0.2872668
Methyl Acetate	0.5	~~0.3857064~~	1	0.3154482	2	0.2903226	5	0.3030329	10	0.2601533	50	0.2434809
Methylcyclohexane	0.5	0.3221109	1	0.2744823	2	0.2967133	5	0.3184141	10	0.3366445	50	0.3560554
Naphthalene	0.5	1.396541	1	1.309217	2	1.336731	5	1.444397	10	1.584445	50	1.887839
Methyl Methacrylate	0.5	0.3092757	1	0.2915724	2	0.3034442	5	0.324452	10	0.3110086	50	0.3413477
4-Methyl-2-pentanone	1	0.2646066	2	0.252653	4	0.2816047	10	0.3064083	20	0.2857459	100	0.309209
Methyl t-Butyl Ether	0.5	0.7599554	1	0.7730025	2	0.7712577	5	0.8224021	10	0.7764854	50	0.8366818
n-Propylbenzene	0.5	3.205478	1	2.985857	2	3.16137	5	3.395684	10	3.540615	50	3.815046
Propionitrile	5	3.860689E-02	10	3.631281E-02	20	3.519208E-02	50	3.953202E-02	100	3.526257E-02	500	3.705665E-02
Styrene	0.5	1.294131	1	1.170637	2	1.364739	5	1.573669	10	1.623073	50	1.83601
1,1,2,2-Tetrachloroethane	0.5	0.7764107	1	0.665799	2	0.7153891	5	0.7611308	10	0.7028783	50	0.7666392
1,1,1,2-Tetrachloroethane	0.5	0.6226685	1	0.562134	2	0.5591843	5	0.6168669	10	0.6211794	50	0.6923942
tert-Butyl alcohol	2.5	3.176149E-02	5	2.457954E-02	10	2.613583E-02	25	2.906846E-02	50	0.0246684	250	0.0253521
Tetrachloroethene	0.5	0.5831615	1	0.531873	2	0.5567103	5	0.5878116	10	0.6088291	50	0.6332623
Toluene	0.5	1.412809	1	1.197301	2	1.319581	5	1.380792	10	1.36182	50	1.44104
1,2,3-Trichlorobenzene	0.5	0.7666192	1	0.5883716	2	0.6407529	5	0.6965532	10	0.7155865	50	0.8062701
1,2,4-Trichlorobenzene	0.5	0.854359	1	0.6807511	2	0.676849	5	0.7072572	10	0.7758474	50	0.8834649
1,1,2-Trichloroethane	0.5	0.3890891	1	0.3958161	2	0.4014425	5	0.4122413	10	0.4019966	50	0.4322855
1,1,1-Trichloroethane	0.5	0.5217442	1	0.4704436	2	0.5074111	5	0.5415151	10	0.5462556	50	0.5666079
Tetrahydrofuran	0.5	1.841877E-02	1	2.506065E-02	2	2.459633E-02	5	2.873582E-02	10	2.212781E-02	50	2.689194E-02
Trichloroethene	0.5	0.2818651	1	0.2674811	2	0.2987899	5	0.3121037	10	0.3107088	50	0.3225856
Trichlorofluoromethane	0.5	0.6398708	1	0.5539193	2	0.5702624	5	0.5984556	10	0.6218806	50	0.6265427
1,2,3-Trichloropropane	0.5	0.1660554	1	0.2371613	2	0.2524576	5	0.2528296	10	0.2191469	50	0.2367786
1,3,5-Trimethylbenzene	0.5	2.30005	1	2.177489	2	2.526539	5	2.600353	10	2.69682	50	2.870595
1,2,4-Trimethylbenzene	0.5	2.253204	1	1.995397	2	2.275653	5	2.6207	10	2.67682	50	2.908348
1,1,2-Trichloro-1,2,2-trifluoroethan	0.5	0.3112336	1	0.2766365	2	0.2852565	5	0.3025787	10	0.3143801	50	0.3104713
Vinyl chloride	0.5	0.3408922	1	0.2999738	2	0.310551	5	0.3231103	10	0.3283657	50	0.3495405
m,p-Xylene	1	2.246943	2	1.869453	4	2.121209	10	2.292826	20	2.219465	100	2.419415
o-Xylene	0.5	2.076086	1	1.943112	2	2.221894	5	2.375454	10	2.334007	50	2.506241

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Vinyl acetate	1	0.7117693	2	0.6064282	4	0.6582203	10	0.7077768	20	0.6245841	100	0.7046624
Xylenes (total)	1.5	2.189991	3	1.894006	6	2.15477	15	2.320369	30	2.257646	150	2.448357
Dibromofluoromethane	30	0.3511555	35	0.3518626	40	0.348243	50	0.3572767	60	0.3526151	70	0.3506151
1,2-Dichloroethane-d4	30	6.416354E-02	35	6.463041E-02	40	6.380276E-02	50	6.416572E-02	60	6.290977E-02	70	6.569801E-02
Toluene-d8	30	2.080908	35	2.05466	40	2.096888	50	2.098553	60	2.104103	70	2.099524
tert-Amyl alcohol	2.5	1.535864E-02	5	1.235799E-02	10	1.185063E-02	25	1.453703E-02	50	1.333665E-02	250	1.598225E-02
tert-Amyl ethyl ether	0.5	0.7149237	1	0.6502484	2	0.6871218	5	0.7644553	10	0.7736503	50	0.8430522
1,3,5-Trichlorobenzene	0.5	0.9123402	1	0.7463691	2	0.8448275	5	0.8628449	10	0.8558897	50	0.9772468
Diethyl ether	0.5	0.264099	1	0.211723	2	0.2517096	5	0.2439819	10	0.2473803	50	0.245608

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Acetone	200	0 1223536	300	0 1242457	400	0 1203613						
Acetonitrile	1000	4 048689E-02	1500	4 303058E-02	2000	4 536802E-02						
Acrolein	500	3 837757E-02	750	3 912383E-02	1000	4 368877E-02						
Acrylonitrile	500	0 1058304	750	0 1103694	1000	0 1157639						
Benzene	100	1 045684	150	1 069117	200	1 100555						
Allyl chloride	100	0 1301861	150	0 1353574	200	0 1344522						
Bromobenzene	100	0 8347792	150	0 8609046	200	0 8587283						
Bromochloromethane	100	0 1721562	150	0 1718145	200	0 1726678						
Tert-Amyl Methyl Ether	100	0 8485488	150	0 8724162	200	0 8822091						
Bromodichloromethane	100	0 4857391	150	0 4830007	200	0 4777352						
Bromoform	100	0 4940723	150	0 5233153	200	0 5206683						
Bromomethane	100	0 2458489	150	0 2511362	200	0 2472115						
Bromofluorobenzene	30	0 954001	30	0 9524235	30	0 9466962						
n-Butylbenzene	100	2 195223	150	2 239683	200	2 210941						
2-Butanone	200	0 1517842	300	0 1519968	400	0 1574109						
sec-Butylbenzene	100	3 141262	150	3 247052	200	3 0715						
tert-Butylbenzene	100	2 599745	150	2 678873	200	2 649429						
Carbon disulfide	100	0 8828894	150	0 941503	200	0 9613434						
Carbon tetrachloride	100	0 5002427	150	0 5065613	200	0 4899897						
Chlorobenzene	100	1 78377	150	1 890187	200	1 876812						
Chloroethane	100	0 1983627	150	0 2050283	200	0 2033424						
Chloroform	100	0 5957633	150	0 5961112	200	0 5820782						
2-Chloroethyl vinyl ether	200	7 136481E-02	300	8 930096E-02	400	8 148637E-02						
Chloromethane	100	0 3895644	150	0 3950223	200	0 3922326						
1-Chlorohexane	100	0 7278216	150	0 7782844	200	0 7752522						
2-Chlorotoluene	100	2 46575	150	2 534251	200	2 433013						
Chloroprene	100	0 6591449	150	0 6663138	200	0 6694291						
4-Chlorotoluene	100	2 921919	150	2 95303	200	2 872079						
Cyclohexane	100	0 4510599	150	0 477335	200	0 495946						
Dibromochloromethane	100	0 8234533	150	0 8620765	200	0 8459628						
1,2-Dibromo-3-chloropropane	100	0 1596723	150	0 1658598	200	0 173507						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
1,2-Dibromoethane (EDB)	100	0 663114	150	0 6958268	200	0 6866003						
Dibromomethane	100	0 2167777	150	0 2146884	200	0 2170703						
1,2-Dichlorobenzene	100	1 513378	150	1 558144	200	1 528831						
1,3-Dichlorobenzene	100	1 564907	150	1 579102	200	1 598892						
trans-1,4-Dichloro-2-butene	100	0 3797488	150	0 3968828	200	0 3748107						
cis-1,4-Dichloro-2-butene	100	0 4071157	150	0 4301267	200	0 4068888						
1,4-Dichlorobenzene	100	1 591644	150	1 624969	200	1 62976						
Dichlorodifluoromethane	100	0 4434886	150	0 4398639	200	0 4336788						
1,1-Dichloroethane	100	0 5680167	150	0 576059	200	0 5821218						
1,2-Dichloroethane	100	0 6743237	150	0 6614162	200	0 6371142						
1,1-Dichloroethene	100	0 2497366	150	0 2631636	200	0 2638804						
cis-1,2-Dichloroethene	100	0 2899578	150	0 2937441	200	0 2938337						
trans-1,2-Dichloroethene	100	0 2577781	150	0 2655436	200	0 2695976						
1,2-Dichloroethene (total)	200	0 273868	300	0 2796439	400	0 2817156						
1,2-Dichloropropane	100	0 2951371	150	0 3028902	200	0 303376						
1,3-Dichloropropane	100	0 9828179	150	1 01845	200	1 021113						
2,2-Dichloropropane	100	0 4978559	150	0 5065538	200	0 4904188						
1,1-Dichloropropene	100	0 4292606	150	0 4402576	200	0 4435662						
cis-1,3-Dichloropropene	100	0 4898485	150	0 4880797	200	0 4936149						
trans-1,3-Dichloropropene	100	1 157612	150	1 20862	200	1 188933						
Diisopropyl Ether	100	1 111236	150	1 135147	200	1 153771						
1,4-Dioxane	2000	2 79041E-03	3000	2 808772E-03	4000	2 95784E-03						
Ethylbenzene	100	2 972394	150	3 127638	200	2 970953						
Ethyl tert-Butyl Ether	100	1 11604	150	1 124914	200	1 132971						
Ethyl Methacrylate	100	0 8139891	150	0 8582517	200	~~0 889472~~						
Hexachlorobutadiene	100	0 5576849	150	0 5798926	200	0 5687879						
Hexane	100	0 2336751	150	0 2502461	200	0 2584357						
2-Hexanone	200	0 4644608	300	0 5025928	400	0 5090106						
Iodomethane	100	0 4981459	150	0 5237961	200	0 5335033						
Isobutyl alcohol	2000	5 873728E-03	3000	6 344857E-03	4000	6 877599E-03						
Isopropylbenzene	100	2 688822	150	2 860662	200	2 784206						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
p-Isopropyltoluene	100	2 802304	150	2 871013	200	2 800058						
Methacrylonitrile	1000	0 223612	1500	0 2295319	2000	0 2297651						
Methylene chloride	100	0 2815487	150	0 2842341	200	0 289209						
Methyl Acetate	100	0 2417526	150	0 2459678	200	0 2563304						
Methylcyclohexane	100	0 329101	150	0 3514488	200	0 3631279						
Naphthalene	100	2 104761	150	2 135807	200	2 27305						
Methyl Methacrylate	100	0 3472788	150	0 3568722	200	0 3612607						
4-Methyl-2-pentanone	200	0 31566	300	0 3235698	400	0 3336355						
Methyl t-Butyl Ether	100	0 8371678	150	0 8593533	200	0 8713245						
n-Propylbenzene	100	3 747354	150	3 8915	200	3 449316						
Propionitrile	1000	3 713059E-02	1500	3 857757E-02	2000	4 502207E-02						
Styrene	100	1 875727	150	1 962025	200	1 989463						
1,1,2,2-Tetrachloroethane	100	0 7527225	150	0 7735203	200	0 7847629						
1,1,1,2-Tetrachloroethane	100	0 7042877	150	0 7302072	200	0 7187477						
tert-Butyl alcohol	500	2 495374E-02	750	2 620211E-02	1000	2 588372E-02						
Tetrachloroethene	100	0 6199359	150	0 661779	200	0 6570152						
Toluene	100	1 470023	150	1 534846	200	1 566377						
1,2,3-Trichlorobenzene	100	0 8351867	150	0 854558	200	0 8671405						
1,2,4-Trichlorobenzene	100	0 9129762	150	0 9340574	200	0 9307971						
1,1,2-Trichloroethane	100	0 4319802	150	0 4566432	200	0 458466						
1,1,1-Trichloroethane	100	0 5293447	150	0 5396075	200	0 5219224						
Tetrahydrofuran	100	2 769061E-02	150	2 782133E-02	200	2 897638E-02						
Trichloroethene	100	0 3174289	150	0 3209899	200	0 3173508						
Trichlorofluoromethane	100	0 5773918	150	0 5890049	200	0 5715509						
1,2,3-Trichloropropane	100	0 2312847	150	0 2404587	200	0 2354357						
1,3,5-Trimethylbenzene	100	2 832287	150	2 864537	200	2 798373						
1,2,4-Trimethylbenzene	100	2 889999	150	2 913238	200	2 90222						
1,1,2-Trichloro-1,2,2-trifluoroethan	100	0 2862736	150	0 2997365	200	0 3023734						
Vinyl chloride	100	0 3502053	150	0 3647242	200	0 3559123						
m,p-Xylene	200	2 452378	300	2 344619	400	1 965535						
o-Xylene	100	2 535753	150	2 586349	200	2 602022						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Vinyl acetate	200	0 7176122	300	0 7803305	400	0 784598						
Xylenes (total)	300	2 480169	450	2 425196	600	2 177697						
Dibromofluoromethane	30	0 3394245	30	0 3340694	30	0 3306909						
1,2-Dichloroethane-d4	30	6 086263E-02	30	6 184593E-02	30	6 174716E-02						
Toluene-d8	30	2 101308	30	2 130443	30	2 130386						
tert-Amyl alcohol	500	0 0167918	750	1 784867E-02	1000	1 918408E-02						
tert-Amyl ethyl ether	100	0 855408	150	0 8698864	200	0 8717509						
1,3,5-Trichlorobenzene	100	0 9946224	150	1 015757	200	1 01148						
Diethyl ether	100	0 2546247	150	0 2726478	200	0 2723049						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Acetone	0 143789	24 31662	3 59125	0 1787929	0 999671		0 995	
Acetonitrile	4 375729E-02	13 03298	3 666667	0 5783599			15	
Acrolein	3 667172E-02	10 85392	3 475	0 1539715			15	
Acrylonitrile	0 1110355	8 081635	4 42	0 1595104			15	
Benzene	1 009034	6 121714	7 485555	7 189717E-02			15	
Allyl chloride	0 1277495	4 298736	4 487778	9 646297E-02			15	
Bromobenzene	0 8164655	5 724375	12 21778	3 150273E-02			15	
Bromochloromethane	0 1649431	6 610323	6 578889	4 857425E-02			15	
Tert-Amyl Methyl Ether	0 7758422	11 2879	7 685556	0 0694881			15	
Bromodichloromethane	0 4544716	6 611337	8 474444	6 333754E-02			15	
Bromoform	0 4090854	22 79818	11 62444	4 373709E-02		0 9995946	SPCC (0 1)	
Bromomethane	0 2577863	11 77635	2 671111	0 1253754			15	
Bromofluorobenzene	0 9659739	1 497042	12 05778	2 916133E-02			15	
n-Butylbenzene	1 932734	14 92743	13 64556	3 968718E-02			15	
2-Butanone	0 1523739	6 709003	6 051111	5 124335E-02			15	
sec-Butylbenzene	2 862247	12 11066	13 10556	3 988223E-02			15	
tert-Butylbenzene	2 392525	11 89966	12 87667	4 356942E-02			15	
Carbon disulfide	0 8509587	10 26425	4 571111	7 083462E-02			15	
Carbon tetrachloride	0 4748804	7 229955	7 452222	6 084384E-02			15	
Chlorobenzene	1 750929	6 53941	10 90222	3 945996E-02			SPCC (0 3)	
Chloroethane	0 1944786	8 41338	2 8	9 061371E-03			15	
Chloroform	0 6152241	10 50876	6 554445	8 215545E-02			CCC (30)	
2-Chloroethyl vinyl ether	7 869282E-02	8 630171	8 84	5 305915E-02			15	
Chloromethane	0 3737014	10 47359	2 102222	0 2083576			SPCC (0 1)	
1-Chlorohexane	0 7461157	10 46423	10 87667	4 793572E-02			15	
2-Chlorotoluene	2 378259	6 762953	12 43556	4 278261E-02			15	
Chloroprene	0 6426785	6 29916	5 85	8 738947E-02			15	
4-Chlorotoluene	2 786033	7 533473	12 50222	3 551636E-02			15	
Cyclohexane	0 4412139	10 33837	7 381111	4 442025E-02			15	
Dibromochloromethane	0 7325203	14 56001	10 14	5 259225E-02			15	
1,2-Dibromo-3-chloropropane	0 1342994	25 85084	14 24125	1 845794E-02		0 9999589	0 99	
1,2-Dibromoethane (EDB)	0 6321267	8 949404	10 34889	2 811125E-02			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Dibromomethane	0 2149248	6 764273	8 405555	5 955256E-02			15	
1,2-Dichlorobenzene	1 427673	8 235468	13 60111	1 929657E-02			15	
1,3-Dichlorobenzene	1 508588	4 655512	13 19333	3 685081E-02			15	
trans-1,4-Dichloro-2-butene	0 3460767	13 9858	12 02125	2 376142E-02			15	
cis-1,4-Dichloro-2-butene	0 3665839	12 42429	11 70889	2 758372E-02			15	
1,4-Dichlorobenzene	1 557413	6 600556	13 28222	3 724333E-02			15	
Dichlorodifluoromethane	0 4354368	9 122488	1 902222	0 2317774			15	
1,1-Dichloroethane	0 5699805	4 9389	5 59	1 317553E-02			SPCC (0 1)	
1,2-Dichloroethane	0 6785732	3 962158	7 318889	4 316269E-02			15	
1,1-Dichloroethene	0 251518	5 710461	4 04	0 0136054			CCC (30)	
cis-1,2-Dichloroethene	0 2770001	7 01021	6 301111	0 1244704			15	
trans-1,2-Dichloroethene	0 2574982	4 009072	5 204444	0 1000304			15	
1,2-Dichloroethene (total)	0 2672492	5 064489	6 301111	0 1244704			15	
1,2-Dichloropropane	0 2770446	8 371838	8 297778	4 797973E-02			CCC (30)	
1,3-Dichloropropane	0 9481422	6 617396	9 883334	4 963371E-02			15	
2,2-Dichloropropane	0 4791702	5 979964	6 406667	7 735277E-02			15	
1,1-Dichloropropene	0 4183984	7 092991	7 333333	6 658381E-02			15	
cis-1,3-Dichloropropene	0 4287898	14 35212	9 045556	5 672472E-02			15	
trans-1,3-Dichloropropene	1 031477	14 22543	9 521111	3 532554E-02			15	
Diisopropyl Ether	1 053579	7 930613	5 972222	7 036451E-02			15	
1,4-Dioxane	2 473845E-03	14 35623	8 46	6 046944E-02			15	
Ethylbenzene	2 73247	11 19746	11 05	4 248291E-02			CCC (30)	
Ethyl tert-Butyl Ether	1 039726	8 928137	6 436667	7 972155E-02			15	
Ethyl Methacrylate	0 7101988	14 49481	9 71375	5 660601E-02			15	
Hexachlorobutadiene	0 550075	4 107061	15 60111	2 482048E-02			15	
Hexane	0 2315308	9 833396	5 795556	9 331608E-02			15	
2-Hexanone	0 4419242	10 89205	9 825555	0 0546362			15	
Iodomethane	0 4339556	18 14902	4 233333	0 1187631		0 9999163	0 99	
Isobutyl alcohol	5 672553E-03	14 10708	6 668889	0 1166975			15	
Isopropylbenzene	2 497949	14 15158	11 94875	2 108918E-02			15	
p-Isopropyltoluene	2 569078	10 91057	13 24333	3 673612E-02			15	
Methacrylonitrile	0 2189106	5 409314	6 221111	0 2473932			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Methylene chloride	0 3040354	8 770955	4 5325	0 103154			15	
Methyl Acetate	0 2695611	10 7981	4 40625	0 1179939			15	
Methylcyclohexane	0 3275665	8 778339	8 62	0 0571821			15	
Naphthalene	1 719199	22 24028	15 46556	3 240156E-02		0 9997636	0 99	
Methyl Methacrylate	0 3273903	7 688068	8 436666	0 0549356			15	
4-Methyl-2-pentanone	0 2970103	9 231002	8 977777	4 607543E-02			15	
Methyl t-Butyl Ether	0 8119589	5 200309	5 214444	0 1008507			15	
n-Propylbenzene	3 465802	9 032782	12 35556	4 197886E-02			15	
Propionitrile	3 807703E-02	7 888361	5 771111	0 1347432			15	
Styrene	1 632164	18 62952	11 52444	3 893919E-02		0 99993	0 99	
1,1,2,2-Tetrachloroethane	0 7443614	5 434138	11 87333	4 045401E-02			SPCC (0 3)	
1,1,1,2-Tetrachloroethane	0 6475189	10 14053	10 94778	4 148684E-02			15	
tert-Butyl alcohol	2 651171E-02	9 008457	4 22	0 1165554			15	
Tetrachloroethene	0 6044864	7 261824	10 25111	0 0318367			15	
Toluene	1 409399	7 980239	9 52	5 230498E-02			CCC (30)	
1,2,3-Trichlorobenzene	0 7523376	13 07447	15 75222	4 246755E-02			15	
1,2,4-Trichlorobenzene	0 8173732	13 23476	15 31444	3 697279E-02			15	
1,1,2-Trichloroethane	0 4199956	6 177849	9 674445	5 662562E-02			15	
1,1,1-Trichloroethane	0 5272058	5 17292	7 114444	7 249428E-02			15	
Tetrahydrofuran	2 559107E-02	13 61588	6 771111	5 194914E-02			15	
Trichloroethene	0 3054782	6 269524	8 251111	3 955365E-02			15	
Trichlorofluoromethane	0 5943199	4 953716	3 277778	0 2033991			15	
1,2,3-Trichloropropane	0 2301787	11 35989	11 99889	2 882502E-02			15	
1,3,5-Trimethylbenzene	2 629671	9 618818	12 53444	4 630965E-02			15	
1,2,4-Trimethylbenzene	2 603953	13 34361	12 90778	2 942101E-02			15	
1,1,2-Trichloro-1,2,2-trifluoroethane	0 2987711	4 416668	4 121111	8 230966E-02			15	
Vinyl chloride	0 3359195	6 488497	2 25	0 2221082			CCC (30)	
m,p-Xylene	2 214649	8 923809	11 16444	4 374209E-02			15	
o-Xylene	2 353435	9 92063	11 55333	4 660331E-02			15	
Vinyl acetate	0 6995535	8 801438	5 672222	7 439906E-02			15	
Xylenes (total)	2 260911	8 149375	11 55333	4 660331E-02			15	
Dibromofluoromethane	0 346217	2 658453	6 73	6 522505E-03			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312133
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
1,2-Dichloroethane-d4	6 331399E-02	2 490146	7 225555	7 114916E-02			15	
Toluene-d8	2 099642	1 104215	9 441111	3 858844E-02			15	
tert-Amyl alcohol	1 524975E-02	16 26929	6 944444	7 635195E-02		0 9999426	0 99	
tert-Amyl ethyl ether	0 7811663	10 72246	8 568889	3 499845E-02			15	
1,3,5-Trichlorobenzene	0 9134864	10 18401	14 76111	1 996582E-02			15	
Diethyl ether	0 2515644	7 355314	3 695556	0 1427643			15	

INITIAL CALIBRATION CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Instrument ID:	MS-VOA6	Calibration:	3352001
Lab File ID:	1216ICV1.D	Calibration Date:	12/16/13 07:39
Sequence:	3L35205	Injection Date:	12/16/13
Lab Sample ID:	3L35205-ICV1	Injection Time:	12:15

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Benzene	A	50.00	52.33	1.009034	1.056002		4.7	20
Carbon tetrachloride	A	50.00	49.91	0.4748804	0.4740707		-0.2	20
Chloroform	A	50.00	46.69	0.6152241	0.5745107		-6.6	20
1,2-Dichloroethane	A	50.00	46.97	0.6785732	0.6374698		-6.1	20
cis-1,2-Dichloroethene	A	50.00	52.26	0.2770001	0.2894938		4.5	20
trans-1,2-Dichloroethene	A	50.00	51.74	0.2574982	0.2664364		3.5	20
Methylene chloride	A	50.00	46.79	0.3040354	0.2845066		-6.4	20
Naphthalene	Q	50.00	53.34	1.719199	2.075041		6.7	20
1,1,2,2-Tetrachloroethane	A	50.00	53.94	0.7443614	0.8030801	0.3	7.9	20
1,1,1,2-Tetrachloroethane	A	50.00	53.34	0.6475189	0.6907515		6.7	20
Tetrachloroethene	A	50.00	52.93	0.6044864	0.6398722		5.9	20
1,1,2-Trichloroethane	A	50.00	55.19	0.4199956	0.463585		10.4	20
Trichloroethene	A	50.00	51.10	0.3054782	0.3122094		2.2	20
Vinyl chloride	A	50.00	51.75	0.3359195	0.3476741		3.5	20
Bromofluorobenzene	A	30.00	29.52	0.9659739	0.9504561		-1.6	20
Dibromofluoromethane	A	30.00	28.26	0.346217	0.3261409		-5.8	20
1,2-Dichloroethane-d4	A	30.00	29.62	6.331399E-02	6.250282E-02		-1.3	20
Toluene-d8	A	30.00	30.76	2.099642	2.153026		2.5	20

CONTINUING CALIBRATION CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312133
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Instrument ID:	MS-VOA6	Calibration:	3352001
Lab File ID:	1220CCV1.D	Calibration Date:	12/16/13 07:39
Sequence:	3L35802	Injection Date:	12/20/13
Lab Sample ID:	3L35802-CCV1	Injection Time:	07:42

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Benzene	A	100.0	98.11	1.009034	0.9900124		-1.9	20
Carbon tetrachloride	A	100.0	98.56	0.4748804	0.4680644		-1.4	20
Chloroform	A	100.0	90.32	0.6152241	0.5556945		-9.7	20
1,2-Dichloroethane	A	100.0	92.27	0.6785732	0.6261419		-7.7	20
cis-1,2-Dichloroethene	A	100.0	99.29	0.2770001	0.2750338		-0.7	20
trans-1,2-Dichloroethene	A	100.0	96.08	0.2574982	0.2474055		-3.9	20
Methylene chloride	A	100.0	84.17	0.3040354	0.2559152		-15.8	20
Naphthalene	Q	100.0	103.3	1.719199	2.128769		3.3	20
1,1,2,2-Tetrachloroethane	A	100.0	104.7	0.7443614	0.7794281	0.3	4.7	20
1,1,1,2-Tetrachloroethane	A	100.0	101.1	0.6475189	0.6547016		1.1	20
Tetrachloroethene	A	100.0	97.64	0.6044864	0.5902487		-2.4	20
1,1,2-Trichloroethane	A	100.0	105.1	0.4199956	0.4414673		5.1	20
Trichloroethene	A	100.0	97.18	0.3054782	0.2968731		-2.8	20
Vinyl chloride	A	100.0	88.94	0.3359195	0.2987625		-11.1	20
Bromofluorobenzene	A	30.00	30.47	0.9659739	0.9810704		1.6	20
Dibromofluoromethane	A	30.00	29.36	0.346217	0.3388463		-2.1	20
1,2-Dichloroethane-d4	A	30.00	30.07	6.331399E-02	6.345442E-02		0.2	20
Toluene-d8	A	30.00	30.46	2.099642	2.131991		1.5	20

HOLDING TIME SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC SDG: 1312133

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
MW-114-121713	12/17/13 08:40	12/18/13 09:10	12/20/13 11:25	N/A	14.00	12/20/13 11:25	3.11	14.00	
MW-119-121713	12/17/13 08:45	12/18/13 09:10	12/20/13 17:23	N/A	14.00	12/20/13 17:23	3.36	14.00	
FD-01-121713	12/17/13 08:50	12/18/13 09:10	12/20/13 17:51	N/A	14.00	12/20/13 17:51	3.38	14.00	
MW-112-121713	12/17/13 10:03	12/18/13 09:10	12/20/13 11:52	N/A	14.00	12/20/13 11:52	3.08	14.00	
MW-113-121713	12/17/13 10:05	12/18/13 09:10	12/20/13 12:20	N/A	14.00	12/20/13 12:20	3.09	14.00	
MW-106-121713	12/17/13 10:54	12/18/13 09:10	12/20/13 12:48	N/A	14.00	12/20/13 12:48	3.08	14.00	
MW-107-121713	12/17/13 11:40	12/18/13 09:10	12/20/13 13:15	N/A	14.00	12/20/13 13:15	3.07	14.00	
MW-121-121713	12/17/13 13:43	12/18/13 09:10	12/20/13 13:43	N/A	14.00	12/20/13 13:43	3.00	14.00	
MW-107S-121713	12/17/13 14:00	12/18/13 09:10	12/20/13 14:10	N/A	14.00	12/20/13 14:10	3.01	14.00	
Trip Blank #02693	12/17/13 14:40	12/18/13 09:10	12/20/13 10:30	N/A	14.00	12/20/13 10:30	2.83	14.00	

PREPARATION BENCH SHEET

3L20009

Empirical Laboratories, LLC **Printed: 1/7/2014 1:38:06PM**

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments
1312124-03RE1	C	VOC_8260B_REG	12/20/2013	5	5				1	2	Re-extract added 12/20/2013 by ADM-RR 100X(ccl4/tce)
1312124-04RE1	C	VOC_8260B_REG	12/20/2013	5	5				1	2	Re-extract added 12/20/2013 by ADM-RR 100X(ccl4/tce)
1312133-01	B	VOC_8260B_REG	12/20/2013	5	5				1	2	MS/MSD low MDLs. DIL Approval Required
1312133-02	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required-20X-T
1312133-03	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required-20X-T
1312133-04	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-05	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-06	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-07	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-08	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-09	B	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312133-10	A	VOC_8260B_REG	12/20/2013	5	5				1	2	low MDLs. DIL Approval Required
1312136-01	B	VOC_8260B_REG	12/20/2013	5	5				1	2	
1312136-02	B	VOC_8260B_REG	12/20/2013	5	5				1	2	
1312136-03	B	VOC_8260B_REG	12/20/2013	5	5				1	2	
1312136-04	B	VOC_8260B_REG	12/20/2013	5	5				1	2	
1312136-12	A	VOC_8260B_REG	12/20/2013	5	5				1	2	
3L20009-BLK1		QC	12/20/2013	5	5				1	NA	
3L20009-BS1		QC	12/20/2013	5	5	13L0335		2.5	1	NA	
3L20009-MS1		QC	12/20/2013	5	5	13L0335	1312133-01	2.5	1	NA	
3L20009-MSD1		QC	12/20/2013	5	5	13L0335	1312133-01	2.5	1	NA	

PREPARATION BENCH SHEET

3L20009

Empirical Laboratories, LLC

Printed: 1/7/2014 1:38:06PM

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments

Reagents Used:

Standard	Description
12A0500	Anti-foam-GE_AF72

ANALYTICAL DATA PACKAGE
SDG # 1312151

PROJECT NAME: ST. LOUIS ORDINANCE PLANT
PROJECT LOCATION: ST. LOUIS, MO
CONTRACT #: 953646

SUBMITTAL TO:
Shane Lowe
CH2M HILL, Inc.
1034 South Brentwood Blvd., Suite 2300
Richmond Heights, MO 63117

SUBMITTAL BY:
Empirical Laboratories, LLC (EL)
621 Mainstream Drive, Suite 270
Nashville, TN 37228
Tel (615)345-1115
Fax (866)417-0548

LABORATORY CONTACT PERSON:
Project Manager: Sonya Gordon
Tel (615)345-1115
Fax (866)417-0548
Email: sgordon@empirlabs.com

Original Report Date: January 8, 2014
Report Revision #: N/A
Revision Date: N/A
Total # of Pages: 65

THIS DOCUMENT MEETS DoD QSM 4.2 STANDARDS

The results relate to only the samples associated with the referenced SDG and the submitted data has been produced in accordance with laboratory procedures. The Laboratory's Technical Lab Director, Mr. Rick Davis, is responsible for the final data produced and reported. His signature is listed at the end of the Case Narrative within the Analytical Data Package. If applicable to this report package, details on report revisions and the information on subcontracted analysis are listed in the package Case Narrative. This report shall not be reproduced, except in full, without the written approval of Empirical Laboratories, LLC.

L-A-B Accredited Certificate Number L2226

Table of Contents

Sample Delivery Group Case Narrative

Receipt Information
The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. There were no subcontracted analyses for this SDG.

Changes to the Revision
This is an original submittal of the final report package.

Analytical Information
All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. Sample prep and dilution information is provided within the final results report and at the beginning of each form set. The following information is provided specific to individual methods:

Chromatographic Flags for Manual Integration:
The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.
B: The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
C: The peak was manually integrated to correct the baseline from the original chromatogram.
D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.
E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

SW8260B:

Note –Sample 1312151-04 was analyzed at a 2x due to the sample foaming during screening. Samples 1312151-06 and -07 were analyzed at a 50x based on screen results but were over-diluted and re-analyzed as 1312151-06RE1 and -07RE1 at 20x dilutions. The original analyses for samples 1312151-06 and -07 are not included in the report.

No additional anomalies or deviations are noted.

Data Qualifiers
As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

DL: The detection limit (DL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The DL is supported by the method detection limit (MDL) which is determined from analysis of a sample containing the analyte in a given matrix.

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 4.2 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 4.2 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

*****: Exceeding quality control criteria are associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound. For Metals, the qualifier indicates that the serial dilution was outside of the control limits and the compound should be considered estimated due to the presence of interference.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the LOQ. One should feel confident that the result is greater than zero and less than the LOQ.

M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters DL/LOD/LOQ have been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The relative percent difference (RPD) and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard exceeded criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

LIMS Definitions / Naming Conventions:

The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And "**RE"** implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:
I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, Ms. Marcia K. McGinnity or an approved technical designee is authorized to sign this Statement of Data Authenticity.

Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

Empirical Laboratories, LLC
Certifications/Approvals
(Revised 12/16/2013)

DoD ELAP, Certificate Number L2226
- Aqueous
- Non-aqueous
- Expires: 11/30/2015

State of Florida, Department of Health – NELAP, Lab ID: E87646
- Clean Water Act
- RCRA/CERCLA
- Expires: 06/30/2014

State of Georgia, Environmental Protection Agency – NELAP
- Expires: 06/30/2014

State of Illinois, Environmental Protection Agency – NELAP, Certificate No.: 003300
- Groundwater
- Solid and Hazardous Waste
- Expires: 09/13/2014

State of Kansas Department of Health and Environment – NELAP, Certificate No.: E-10407
- Aqueous
- Non-aqueous
- Expires: 04/30/2014

State of Kentucky Department of Environmental Protection – NELAP, Certificate No.: 77
- Aqueous
- Non-aqueous
- Expires: 06/30/2014

State of Nevada, Department of Conservation and Natural Resources – NELAP, Certificate No.: TN000042013-1
- Aqueous
- Non-aqueous
- Expires: 07/31/2014

State of New Jersey Department of Environmental Protection – NELAP, Lab ID: TN473
- Water Pollution
- Solid and Hazardous Waste
- Expires: 06/30/2014

State of North Carolina, Department of Environment and Natural Resources - Certificate No.: 643
- Aqueous
- Non-aqueous
- Expires: 12/31/2014

State of North Dakota, Department of Health – NELAP, Certificate No.: R-204
- Aqueous
- Non-aqueous
- Expires: 06/30/2014

State of Texas, Commission on Environmental Quality – NELAP, Certificate No.: T104704307-13-8
- Aqueous
- Non-aqueous
- Expires: 12/31/2013

State of Utah, Department of Health – NELAP, Certificate No.: TN0042013-5
- Aqueous
- Non-aqueous
- Expires: 07/31/2014

Commonwealth of Virginia, Department of General Services – VELAP, Certificate No.: 2558 – Lab ID: 460243
- Aqueous
- Non-aqueous
- Expires: 12/14/2014

State of Washington, Department of Ecology – NELAP, Lab ID: C934-13
- Groundwater
- Solid and Hazardous Waste
- Expires: 03/18/2014

ORGANIC CALCULATIONS

GC/MS Volatiles

$$\text{Final Concentration} = \frac{\text{On-column(ug/L or ug/Kg) * Expected Vol/Weight (mL or g) * Dilution}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

Note - Expected Vol/Weight value is found in "Final Vol" column of Preparation Batch Summary.

GC/MS Extractables

$$\text{Final Concentration} = \frac{\text{On-column(ng/uL) * Final Vol (ml) * Dilution *(1000uL/mL)}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

= ng/mL or ng/g

= ug/L or ug/kg

GC or LC Extractables

$$\text{Final Concentration} = \frac{\text{On-column(ng/mL) * Final Vol (mL) * Dilution}}{\text{Initial Vol/Weight (mL or g) * (Percent Solids/100) (if applicable)}}$$

= ng/mL or ng/g

= ug/L or ug/kg

Sample Receipt Information

13121S1

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 877-345-1113 ♦ (fax) 866-417-0548

21332

Send Results to:	Send Invoice to:
Name Shane Lowe	Name
Company CH2M Hill	Company
Address 1034 S. Brentwood	Address
City St. Louis	City
State, Zip MO, 63117	State, Zip
Phone 314-335-3000	Phone
Fax	Fax
E-mail shane.lowe@ch2m.com	E-mail
Project No./Name: 459603 / SLDF OU-2	**Sampler's (Signature):**

Analysis Requirements: Benzene, Carbon tet., Chloroform, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, Methylene chloride, 1,1,2,2-TeCA, 1,1,2-TCA, Naphthalene, 1,2,4-TCB, PCE, TCE, VC

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	Comments	No. of Bottles	Lab Use Only Containers/Pres.
01	12/18/13 0936	MW-108-121813	GW		3	
02	12/18/13 1000	MW-109-121813			3	
03	12/18/13 1040	MW-109S-121813			3	
04	12/18/13 1048	MW-108S-121813			3	
05	12/18/13 1252	MW-116-121813			3	
06	12/18/13 1255	MW-110-121813			3	
07	12/18/13 1300	FD-01-121813			3	
08	12/18/13 1400	Trip Blank # 02692			2	

	Date/Time:	Received By: (Signature)
Relinquished by: (Signature)	12/18/13 1500	
Relinquished by: (Signature)	Date/Time:	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time: 12/19/13 0926	*Temperature:* -0.8, 1.7

REMARKS:

Details:

Page 1 of 1

Cooler No. 1 of 1

Date Shipped 12/18/13

Shipped By FS

Turnaround STD

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

Cooler Received/Opened On: 12/19/13 0925 Workorder# 1312151

1. Tracking # 6141 (last 4 digits, FedEx)

   Courier: FedEx

2. Temperature of rep. sample or temp blank when opened: -0.9 °C + *correction factor (+0.1)* = -0.8 °C

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO (NA)

4. Were custody seals on outside of cooler? (YES) NO NA

   If yes, how many and where: Two - top

5. Were the seals intact, signed, and dated correctly? (YES) NO NA

6. Were custody papers inside cooler? (YES) NO NA

I certify that I opened the cooler and answered questions 1-6 (initial) _____

7. Were custody seals on containers: YES (NO) and intact YES NO (NA)

   Were these signed and dated correctly? YES NO (NA)

8. Packing material used? (Bubblewrap) (Plastic bag) Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: (Ice) Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? (YES) NO NA

11. Were all container labels complete (#, date, signed, pres., etc)? (YES) NO NA

12. Did all container labels and tags agree with custody papers? (YES) NO NA

13. a. Were VOA vials received? (YES) NO NA

    b. Was there any observable headspace present in any VOA vial? YES (NO) NA

14. Was there a Trip Blank in this cooler? (YES) NO NA If multiple coolers, sequence # _____

I certify that I unloaded the cooler and answered questions 7-14 (initial) JG

15. a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES NO (NA)

    b. Did the bottle labels indicate that the correct preservatives were used YES NO (NA)

16. Was residual chlorine present? YES NO (NA)

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) JG

17. Were custody papers properly filled out (ink, signed, etc)? (YES) NO NA

18. Did you sign the custody papers in the appropriate place? (YES) NO NA

19. Were correct containers used for the analysis requested? (YES) NO NA

20. Was sufficient amount of sample sent in each container? (YES) NO NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) JG

I certify that I attached a label with the unique LIMS number to each container (initial) JG

I certify that I have performed a second check of the LIMS information against the COC to confirm accuracy (initial) _____

21. Were there Non-Conformance issues at login? YES (NO) Was a NCR generated? YES (NO) # _____

Additional Details:

1312151

Empirical Laboratories, LLC

Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Project Manager: Sonya Gordon
Project Number: CH2_SLOP

Report To:
CH2M Hill, Inc.
Shane Lowe
1034 South Brentwood Blvd, Suite 2300
Richmond Heights, MO 63117
Phone: (314) 335-3024
Fax: (314) 421-3927

Invoice To:
CH2M Hill, Inc.
Accounts Payable
P.O.Box 241329
Denver, CO 80224-____
Phone :(303) 771-0952
Fax: (303) 771-0952

Due to Client: 01/14/2014 16:00 *This is the projected due date to the client, at the time of receipt, and is for report delivery via upload, and/or email, and/or shipment to meet TAT as setup by project*

Received By: Joshua T Gross
Date Received: 12/19/2013 09 25
Logged In By: Joshua T Gross
Date Logged In: 12/19/2013 15 47

Samples Received at: **-0.8 C**

Custody Seals	Yes	Received On Ice	Yes
Containers Intact	Yes		
COC/Labels Agree	Yes		
Preservation Confirme	No		

Method	Test Code	Due	TAT	Expires	Comments
1312151-01 MW-108-121813 [Water] Sampled 12/18/2013 09:36 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 09:36	See versions lowMDLs DIL Approval Required
1312151-02 MW-109-121813 [Water] Sampled 12/18/2013 10:00 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 10:00	See versions lowMDLs DIL Approval Required
1312151-03 MW-109S-121813 [Water] Sampled 12/18/2013 10:40 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 10:40	See versions lowMDLs DIL Approval Required
1312151-04 MW-108S-121813 [Water] Sampled 12/18/2013 10:48 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 10:48	See versions lowMDLs DIL Approval Required
1312151-05 MW-116-121813 [Water] Sampled 12/18/2013 12:52 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 12:52	See versions lowMDLs DIL Approval Required
1312151-06 MW-110-121813 [Water] Sampled 12/18/2013 12:55 Central 'Client Sample'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 12:55	See versions lowMDLs DIL Approval Required
1312151-07 FD-01-121813 [Water] Sampled 12/18/2013 13:00 Central 'Field Duplicate'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 13:00	See versions lowMDLs DIL Approval Required

1312151

Empirical Laboratories, LLC

Client:	**CH2M Hill, Inc.**	**Project Manager:**	**Sonya Gordon**
Project:	**St. Louis Ordnance Plant**	**Project Number:**	**CH2_SLOP**

Method	Test Code	Due	TAT	Expires	Comments
1312151-08 Trip Blank #02692 [Water] Sampled 12/18/2013 14:00 Central 'Trip Blank'					
SW8260B	VOC_8260B_REG	01/09/2014 14:00	15	01/01/2014 14:00	See versions lowMDLs DIL Approval Required

Reviewed By

Date

Sample Delivery Group Assignment Form

CLIENT: CH2M Hill, Inc.
PROJECT NAME: St. Louis Ordnance Plant
SDG #: 1312151

QC LEVEL: Level III
Report Due: 1/14/2014
Client Sample Count: 6

Sample Type	Sampled	Received	Lab ID	Client ID	Report Matrix	SW8260B
Client Sample	12/18/2013	12/19/2013	1312151-01	MW-108-121813	Water	X
Client Sample	12/18/2013	12/19/2013	1312151-02	MW-109-121813	Water	X
Client Sample	12/18/2013	12/19/2013	1312151-03	MW-109S-121813	Water	X
Client Sample	12/18/2013	12/19/2013	1312151-04	MW-108S-121813	Water	X
Client Sample	12/18/2013	12/19/2013	1312151-05	MW-116-121813	Water	X
Client Sample	12/18/2013	12/19/2013	1312151-06	MW-110-121813	Water	X
Field Duplicate	12/18/2013	12/19/2013	1312151-07	FD-01-121813	Water	X
Trip Blank	12/18/2013	12/19/2013	1312151-08	Trip Blank #02692	Water	X

Data for SW8260B Forms

Sample Extraction Data

Prep Method: 5030B-SW8260B

Lab Number [Field ID]	Batch	Nominal Initial/Final	Initial [mL]	Final [mL]	Dilution	% Solids	Notes	Date
1312151-01 [MW-108-121813]	3L24002	5 00/5 00	5 00	5 00	1 00			12/24/13
1312151-02 [MW-109-121813]	3L24002	5 00/5 00	5 00	5 00	1 00			12/24/13
1312151-03 [MW-109S-121813]	3L24002	5 00/5 00	5 00	5 00	1 00			12/24/13
1312151-04 [MW-108S-121813]	3L24002	5 00/5 00	5 00	5 00	2 00			12/24/13
1312151-05 [MW-116-121813]	3L24002	5 00/5 00	5 00	5 00	1 00			12/24/13
1312151-08 [Trip Blank #02692]	3L24002	5 00/5 00	5 00	5 00	1 00			12/24/13

Sample Extraction Data

Prep Method: 5030B-SW8260B

Lab Number [Field ID]	Batch	Nominal Initial/Final	Initial [mL]	Final [mL]	Dilution	% Solids	Notes	Date
1312151-06RE1 [MW-110-121813]	3L27001	5 00/5 00	5 00	5 00	20 00			12/27/13
1312151-07RE1 [FD-01-121813]	3L27001	5 00/5 00	5 00	5 00	20 00			12/27/13

ANALYSIS DATA SHEET

MW-108-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-01 File ID: 1215101.D

Sampled: 12/18/13 09:36 Prepared: 12/24/13 13:51 Analyzed: 12/24/13 13:51

Solids: Preparation: 5030B Dilution: 1

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene	**0.730**	0.140	0.500	1.00	J
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.04	93.5	75 - 120	
Dibromofluoromethane	30.00	29.97	99.9	85 - 115	
1,2-Dichloroethane-d4	30.00	29.98	99.9	70 - 120	
Toluene-d8	30.00	29.99	100	85 - 120	

ANALYSIS DATA SHEET

MW-109-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-02 File ID: 1215102.D

Sampled: 12/18/13 10:00 Prepared: 12/24/13 14:19 Analyzed: 12/24/13 14:19

Solids: Preparation: 5030B Dilution: 1

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene	**0.310**	0.140	0.500	1.00	J
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.220**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene	**0.760**	0.190	0.500	1.00	J
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.84	96.1	75 - 120	
Dibromofluoromethane	30.00	29.66	98.9	85 - 115	
1,2-Dichloroethane-d4	30.00	31.77	106	70 - 120	
Toluene-d8	30.00	30.50	102	85 - 120	

ANALYSIS DATA SHEET

MW-109S-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-03 File ID: 1215103.D

Sampled: 12/18/13 10:40 Prepared: 12/24/13 14:46 Analyzed: 12/24/13 14:46

Solids: Preparation: 5030B Dilution: 1

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.83	96.1	75 - 120	
Dibromofluoromethane	30.00	30.46	102	85 - 115	
1,2-Dichloroethane-d4	30.00	29.82	99.4	70 - 120	
Toluene-d8	30.00	29.56	98.5	85 - 120	

ANALYSIS DATA SHEET

MW-108S-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-04 File ID: 1215104D.D

Sampled: 12/18/13 10:48 Prepared: 12/24/13 17:04 Analyzed: 12/24/13 17:04

Solids: Preparation: 5030B Dilution: 2

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.300	1.00	2.00	U
56-23-5	Carbon tetrachloride		0.340	1.00	2.00	U
67-66-3	Chloroform		0.340	1.00	2.00	U
107-06-2	1,2-Dichloroethane		0.320	1.00	2.00	U
156-59-2	cis-1,2-Dichloroethene	**48.6**	0.280	1.00	2.00	D
156-60-5	trans-1,2-Dichloroethene	**1.72**	0.440	1.00	2.00	JD
75-09-2	Methylene chloride	**0.340**	0.240	2.00	4.00	JD
91-20-3	Naphthalene		0.320	1.00	2.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.280	1.00	2.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.300	1.00	2.00	U
127-18-4	Tetrachloroethene		0.460	1.00	2.00	U
79-00-5	1,1,2-Trichloroethane		0.400	1.00	2.00	U
79-01-6	Trichloroethene	**29.4**	0.380	1.00	2.00	D
75-01-4	Vinyl chloride		0.280	1.00	2.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.33	94.4	75 - 120	
Dibromofluoromethane	30.00	29.22	97.4	85 - 115	
1,2-Dichloroethane-d4	30.00	30.37	101	70 - 120	
Toluene-d8	30.00	30.11	100	85 - 120	

ANALYSIS DATA SHEET

MW-116-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-05 File ID: 1215105.D

Sampled: 12/18/13 12:52 Prepared: 12/24/13 15:14 Analyzed: 12/24/13 15:14

Solids: Preparation: 5030B Dilution: 1

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride	**0.190**	0.120	1.00	2.00	J
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.94	96.5	75 - 120	
Dibromofluoromethane	30.00	30.17	101	85 - 115	
1,2-Dichloroethane-d4	30.00	30.41	101	70 - 120	
Toluene-d8	30.00	30.22	101	85 - 120	

ANALYSIS DATA SHEET

MW-110-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-06RE1 File ID: 1215106D.D

Sampled: 12/18/13 12:55 Prepared: 12/27/13 13:38 Analyzed: 12/27/13 13:38

Solids: Preparation: 5030B Dilution: 20

Batch: 3L27001 Sequence: 3L36510 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		3.00	10.0	20.0	U
56-23-5	Carbon tetrachloride		3.40	10.0	20.0	U
67-66-3	Chloroform		3.40	10.0	20.0	U
107-06-2	1,2-Dichloroethane	**11.0**	3.20	10.0	20.0	JD
156-59-2	cis-1,2-Dichloroethene	**157**	2.80	10.0	20.0	D
156-60-5	trans-1,2-Dichloroethene		4.40	10.0	20.0	U
75-09-2	Methylene chloride	**7.40**	2.40	20.0	40.0	JD
91-20-3	Naphthalene		3.20	10.0	20.0	U
79-34-5	1,1,2,2-Tetrachloroethane		2.80	10.0	20.0	U
630-20-6	1,1,1,2-Tetrachloroethane		3.00	10.0	20.0	U
127-18-4	Tetrachloroethene	**3010**	4.60	10.0	20.0	D
79-00-5	1,1,2-Trichloroethane		4.00	10.0	20.0	U
79-01-6	Trichloroethene	**135**	3.80	10.0	20.0	D
75-01-4	Vinyl chloride		2.80	10.0	20.0	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.27	97.6	75 - 120	
Dibromofluoromethane	30.00	29.43	98.1	85 - 115	
1,2-Dichloroethane-d4	30.00	32.45	108	70 - 120	
Toluene-d8	30.00	29.75	99.2	85 - 120	

ANALYSIS DATA SHEET

FD-01-121813

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Water Laboratory ID: 1312151-07RE1 File ID: 1215107D.D

Sampled: 12/18/13 13:00 Prepared: 12/27/13 14:06 Analyzed: 12/27/13 14:06

Solids: Preparation: 5030B Dilution: 20

Batch: 3L27001 Sequence: 3L36510 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		3.00	10.0	20.0	U
56-23-5	Carbon tetrachloride		3.40	10.0	20.0	U
67-66-3	Chloroform		3.40	10.0	20.0	U
107-06-2	1,2-Dichloroethane	**10.2**	3.20	10.0	20.0	JD
156-59-2	cis-1,2-Dichloroethene	**159**	2.80	10.0	20.0	D
156-60-5	trans-1,2-Dichloroethene		4.40	10.0	20.0	U
75-09-2	Methylene chloride	**8.80**	2.40	20.0	40.0	JD
91-20-3	Naphthalene		3.20	10.0	20.0	U
79-34-5	1,1,2,2-Tetrachloroethane		2.80	10.0	20.0	U
630-20-6	1,1,1,2-Tetrachloroethane		3.00	10.0	20.0	U
127-18-4	Tetrachloroethene	**2940**	4.60	10.0	20.0	D
79-00-5	1,1,2-Trichloroethane		4.00	10.0	20.0	U
79-01-6	Trichloroethene	**132**	3.80	10.0	20.0	D
75-01-4	Vinyl chloride		2.80	10.0	20.0	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.13	93.8	75 - 120	
Dibromofluoromethane	30.00	29.77	99.2	85 - 115	
1,2-Dichloroethane-d4	30.00	30.81	103	70 - 120	
Toluene-d8	30.00	29.06	96.9	85 - 120	

ANALYSIS DATA SHEET

Trip Blank #02692

Laboratory:	Empirical Laboratories, LLC			SDG:	1312151
Client:	CH2M Hill, Inc.			Project:	St. Louis Ordnance Plant
Matrix:	Water	Laboratory ID:	1312151-08	File ID:	1215108.D
Sampled:	12/18/13 14:00	Prepared:	12/24/13 10:38	Analyzed:	12/24/13 10:38
Solids:		Preparation:	5030B	Dilution:	1
Batch:	3L24002	Sequence:	3L36509	Calibration:	3352001
Instrument:	MS-VOA6				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.15	97.2	75 - 120	
Dibromofluoromethane	30.00	30.06	100	85 - 115	
1,2-Dichloroethane-d4	30.00	30.21	101	70 - 120	
Toluene-d8	30.00	29.99	100	85 - 120	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L36509
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (3L36509-CCV1) ug/L				Lab File ID: 1224CCV1.D		Analyzed: 12/24/13 07:24		
Bromofluorobenzene	30.00	102	80 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	97.1	80 - 120	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	102	80 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	98.0	80 - 120	9.42	9.42	0.0000	+/-1.000	
LCS (3L24002-BS1) ug/L				Lab File ID: 1224LCS1.D		Analyzed: 12/24/13 07:53		
Bromofluorobenzene	30.00	99.2	75 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	97.8	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	97.0	70 - 120	7.2	7.21	-0.0100	+/-1.000	
Toluene-d8	30.00	98.2	85 - 120	9.42	9.42	0.0000	+/-1.000	
Blank (3L24002-BLK1) ug/L				Lab File ID: 1224BLK1.D		Analyzed: 12/24/13 09:43		
Bromofluorobenzene	30.00	96.4	75 - 120	12.03	12.04	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	98.7	85 - 115	6.7	6.71	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.41	9.42	-0.0100	+/-1.000	
Trip Blank #02692 (1312151-08) ug/L				Lab File ID: 1215108.D		Analyzed: 12/24/13 10:38		
Bromofluorobenzene	30.00	97.2	75 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	100	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.2	7.21	-0.0100	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.42	9.42	0.0000	+/-1.000	
MW-108-121813 (1312151-01) ug/L				Lab File ID: 1215101.D		Analyzed: 12/24/13 13:51		
Bromofluorobenzene	30.00	93.5	75 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	99.9	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	99.9	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.43	9.42	0.0100	+/-1.000	
MW-109-121813 (1312151-02) ug/L				Lab File ID: 1215102.D		Analyzed: 12/24/13 14:19		
Bromofluorobenzene	30.00	96.1	75 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	98.9	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	106	70 - 120	7.2	7.21	-0.0100	+/-1.000	
Toluene-d8	30.00	102	85 - 120	9.42	9.42	0.0000	+/-1.000	
MW-109S-121813 (1312151-03) ug/L				Lab File ID: 1215103.D		Analyzed: 12/24/13 14:46		
Bromofluorobenzene	30.00	96.1	75 - 120	12.03	12.04	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	102	85 - 115	6.7	6.71	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	99.4	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	98.5	85 - 120	9.42	9.42	0.0000	+/-1.000	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L36509
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
MW-116-121813 (1312151-05) ug/L				Lab File ID: 1215105.D		Analyzed: 12/24/13 15:14		
Bromofluorobenzene	30.00	96.5	75 - 120	12.04	12.04	0.0000	+/-1.000	
Dibromofluoromethane	30.00	101	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.43	9.42	0.0100	+/-1.000	
MW-108S-121813 (1312151-04) ug/L				Lab File ID: 1215104D.D		Analyzed: 12/24/13 17:04		
Bromofluorobenzene	30.00	94.4	75 - 120	12.03	12.04	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	97.4	85 - 115	6.71	6.71	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	70 - 120	7.2	7.21	-0.0100	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.42	9.42	0.0000	+/-1.000	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L36510
Instrument: MS-VOA6
Calibration: 3352001

Surrogate Compound	Spike Level	% Recovery	Recovery Limits	RT	CCV RT	RT Diff	RT Diff Limit	Q
Calibration Check (3L36510-CCV1) ug/L				Lab File ID: 1227CCV1.D		Analyzed: 12/27/13 06:17		
Bromofluorobenzene	30.00	98.4	80 - 120	12.05	12.05	0.0000	+/-1.000	
Dibromofluoromethane	30.00	98.2	80 - 120	6.72	6.72	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	101	80 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	98.9	80 - 120	9.43	9.43	0.0000	+/-1.000	
LCS (3L27001-BS1) ug/L				Lab File ID: 1227LCS1.D		Analyzed: 12/27/13 06:45		
Bromofluorobenzene	30.00	99.9	75 - 120	12.04	12.05	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	95.4	85 - 115	6.72	6.72	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	102	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	101	85 - 120	9.43	9.43	0.0000	+/-1.000	
Blank (3L27001-BLK1) ug/L				Lab File ID: 1227BLK1.D		Analyzed: 12/27/13 08:35		
Bromofluorobenzene	30.00	95.0	75 - 120	12.04	12.05	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	99.7	85 - 115	6.71	6.72	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	99.0	70 - 120	7.21	7.21	0.0000	+/-1.000	
Toluene-d8	30.00	100	85 - 120	9.43	9.43	0.0000	+/-1.000	
MW-110-121813 (1312151-06RE1) ug/L				Lab File ID: 1215106D.D		Analyzed: 12/27/13 13:38		
Bromofluorobenzene	30.00	97.6	75 - 120	12.04	12.05	-0.0100	+/-1.000	
Dibromofluoromethane	30.00	98.1	85 - 115	6.71	6.72	-0.0100	+/-1.000	
1,2-Dichloroethane-d4	30.00	108	70 - 120	7.22	7.21	0.0100	+/-1.000	
Toluene-d8	30.00	99.2	85 - 120	9.43	9.43	0.0000	+/-1.000	
FD-01-121813 (1312151-07RE1) ug/L				Lab File ID: 1215107D.D		Analyzed: 12/27/13 14:06		
Bromofluorobenzene	30.00	93.8	75 - 120	12.05	12.05	0.0000	+/-1.000	
Dibromofluoromethane	30.00	99.2	85 - 115	6.72	6.72	0.0000	+/-1.000	
1,2-Dichloroethane-d4	30.00	103	70 - 120	7.22	7.21	0.0100	+/-1.000	
Toluene-d8	30.00	96.9	85 - 120	9.43	9.43	0.0000	+/-1.000	

LCS / LCS DUPLICATE RECOVERY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Matrix: Water
Batch: 3L24002
Laboratory ID: 3L24002-BS1
Preparation: 5030B
Initial/Final: 5 mL / 5 mL

ANALYTE	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC.	QC LIMITS REC.
Benzene	50.00	48.8	97.6	80 - 120
Carbon tetrachloride	50.00	42.6	85.1	65 - 140
Chloroform	50.00	40.3	80.5	65 - 135
1,2-Dichloroethane	50.00	44.3	88.6	70 - 130
cis-1,2-Dichloroethene	50.00	50.3	101	70 - 125
trans-1,2-Dichloroethene	50.00	47.8	95.5	60 - 140
Methylene chloride	50.00	44.4	88.7	55 - 140
Naphthalene	50.00	47.9	95.7	55 - 140
1,1,2,2-Tetrachloroethane	50.00	48.8	97.5	65 - 130
1,1,1,2-Tetrachloroethane	50.00	48.2	96.4	80 - 130
Tetrachloroethene	50.00	42.5	85.0	45 - 150
1,1,2-Trichloroethane	50.00	50.3	101	75 - 125
Trichloroethene	50.00	47.2	94.4	70 - 125
Vinyl chloride	50.00	59.6	119	50 - 145

LCS / LCS DUPLICATE RECOVERY

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Matrix: Water
Batch: 3L27001
Laboratory ID: 3L27001-BS1
Preparation: 5030B
Initial/Final: 5 mL / 5 mL

ANALYTE	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC.	QC LIMITS REC.
Benzene	50.00	51.7	103	80 - 120
Carbon tetrachloride	50.00	48.3	96.6	65 - 140
Chloroform	50.00	46.1	92.1	65 - 135
1,2-Dichloroethane	50.00	46.3	92.6	70 - 130
cis-1,2-Dichloroethene	50.00	52.1	104	70 - 125
trans-1,2-Dichloroethene	50.00	52.5	105	60 - 140
Methylene chloride	50.00	47.3	94.5	55 - 140
Naphthalene	50.00	51.0	102	55 - 140
1,1,2,2-Tetrachloroethane	50.00	50.1	100	65 - 130
1,1,1,2-Tetrachloroethane	50.00	51.8	104	80 - 130
Tetrachloroethene	50.00	50.4	101	45 - 150
1,1,2-Trichloroethane	50.00	52.1	104	75 - 125
Trichloroethene	50.00	49.3	98.7	70 - 125
Vinyl chloride	50.00	53.1	106	50 - 145

PREPARATION BATCH SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Batch: 3L24002 Batch Matrix: Water Preparation: 5030B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL /WEIGHT	FINAL VOL
MW-108-121813	1312151-01	12/24/13 13:51	5 00	5 00
MW-109-121813	1312151-02	12/24/13 14:19	5 00	5 00
MW-109S-121813	1312151-03	12/24/13 14:46	5 00	5 00
MW-108S-121813	1312151-04	12/24/13 17:04	5 00	5 00
MW-116-121813	1312151-05	12/24/13 15:14	5 00	5 00
Trip Blank #02692	1312151-08	12/24/13 10:38	5 00	5 00
Blank	3L24002-BLK1	12/24/13 09:43	5 00	5 00
LCS	3L24002-BS1	12/24/13 07:53	5 00	5 00

PREPARATION BATCH SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Batch: 3L27001 Batch Matrix: Water Preparation: 5030B

SAMPLE NAME	LAB SAMPLE ID	DATE PREPARED	INITIAL VOL /WEIGHT	FINAL VOL
MW-110-121813	1312151-06RE1	12/27/13 13:38	5 00	5 00
FD-01-121813	1312151-07RE1	12/27/13 14:06	5 00	5 00
Blank	3L27001-BLK1	12/27/13 08:35	5 00	5 00
LCS	3L27001-BS1	12/27/13 06:45	5 00	5 00

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L24002-BLK1 File ID: 1224BLK1.D

Sampled: Prepared: Analyzed: 12/24/13 09:43

Solids: Preparation: 5030B Dilution:

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.91	96.4	75 - 120	
Dibromofluoromethane	30.00	29.61	98.7	85 - 115	
1,2-Dichloroethane-d4	30.00	30.18	101	70 - 120	
Toluene-d8	30.00	29.99	100	85 - 120	

ANALYSIS DATA SHEET

LCS

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L24002-BS1 File ID: 1224LCS1.D

Sampled: Prepared: Analyzed: 12/24/13 07:53

Solids: Preparation: 5030B Dilution:

Batch: 3L24002 Sequence: 3L36509 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**48.8**	0.150	0.500	1.00	
56-23-5	Carbon tetrachloride	**42.6**	0.170	0.500	1.00	
67-66-3	Chloroform	**40.3**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane	**44.3**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**50.3**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**47.8**	0.220	0.500	1.00	
75-09-2	Methylene chloride	**44.4**	0.120	1.00	2.00	
91-20-3	Naphthalene	**47.9**	0.160	0.500	1.00	
79-34-5	1,1,2,2-Tetrachloroethane	**48.8**	0.140	0.500	1.00	
630-20-6	1,1,1,2-Tetrachloroethane	**48.2**	0.150	0.500	1.00	
127-18-4	Tetrachloroethene	**42.5**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane	**50.3**	0.200	0.500	1.00	
79-01-6	Trichloroethene	**47.2**	0.190	0.500	1.00	
75-01-4	Vinyl chloride	**59.6**	0.140	0.500	1.00	

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.75	99.2	75 - 120	
Dibromofluoromethane	30.00	29.33	97.8	85 - 115	
1,2-Dichloroethane-d4	30.00	29.09	97.0	70 - 120	
Toluene-d8	30.00	29.47	98.2	85 - 120	

ANALYSIS DATA SHEET

Blank

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L27001-BLK1 File ID: 1227BLK1.D

Sampled: Prepared: Analyzed: 12/27/13 08:35

Solids: Preparation: 5030B Dilution:

Batch: 3L27001 Sequence: 3L36510 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.150	0.500	1.00	U
56-23-5	Carbon tetrachloride		0.170	0.500	1.00	U
67-66-3	Chloroform		0.170	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.160	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.140	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.220	0.500	1.00	U
75-09-2	Methylene chloride		0.120	1.00	2.00	U
91-20-3	Naphthalene		0.160	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.140	0.500	1.00	U
630-20-6	1,1,1,2-Tetrachloroethane		0.150	0.500	1.00	U
127-18-4	Tetrachloroethene		0.230	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.200	0.500	1.00	U
79-01-6	Trichloroethene		0.190	0.500	1.00	U
75-01-4	Vinyl chloride		0.140	0.500	1.00	U

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.50	95.0	75 - 120	
Dibromofluoromethane	30.00	29.92	99.7	85 - 115	
1,2-Dichloroethane-d4	30.00	29.69	99.0	70 - 120	
Toluene-d8	30.00	30.05	100	85 - 120	

ANALYSIS DATA SHEET

LCS

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Matrix: Laboratory ID: 3L27001-BS1 File ID: 1227LCS1.D

Sampled: Prepared: Analyzed: 12/27/13 06:45

Solids: Preparation: 5030B Dilution:

Batch: 3L27001 Sequence: 3L36510 Calibration: 3352001 Instrument: MS-VOA6

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**51.7**	0.150	0.500	1.00	
56-23-5	Carbon tetrachloride	**48.3**	0.170	0.500	1.00	
67-66-3	Chloroform	**46.1**	0.170	0.500	1.00	
107-06-2	1,2-Dichloroethane	**46.3**	0.160	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**52.1**	0.140	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**52.5**	0.220	0.500	1.00	
75-09-2	Methylene chloride	**47.3**	0.120	1.00	2.00	
91-20-3	Naphthalene	**51.0**	0.160	0.500	1.00	
79-34-5	1,1,2,2-Tetrachloroethane	**50.1**	0.140	0.500	1.00	
630-20-6	1,1,1,2-Tetrachloroethane	**51.8**	0.150	0.500	1.00	
127-18-4	Tetrachloroethene	**50.4**	0.230	0.500	1.00	
79-00-5	1,1,2-Trichloroethane	**52.1**	0.200	0.500	1.00	
79-01-6	Trichloroethene	**49.3**	0.190	0.500	1.00	
75-01-4	Vinyl chloride	**53.1**	0.140	0.500	1.00	

Total Target Analytes Reported: 14

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.98	99.9	75 - 120	
Dibromofluoromethane	30.00	28.63	95.4	85 - 115	
1,2-Dichloroethane-d4	30.00	30.68	102	70 - 120	
Toluene-d8	30.00	30.32	101	85 - 120	

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Lab File ID:	1216TUN1.D	Injection Date:	12/16/13
Instrument ID:	MS-VOA6	Injection Time:	06:17
Sequence:	3L35205	Lab Sample ID:	3L35205-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	28	PASS
75	30 - 60% of 95	57.3	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.48	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	75.9	PASS
175	5 - 9% of 174	7.36	PASS
176	95 - 101% of 174	97.5	PASS
177	5 - 9% of 176	6.33	PASS

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Lab File ID:	1224TUN1.D	Injection Date:	12/24/13
Instrument ID:	MS-VOA6	Injection Time:	06:57
Sequence:	3L36509	Lab Sample ID:	3L36509-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	29	PASS
75	30 - 60% of 95	56.4	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.24	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	68.1	PASS
175	5 - 9% of 174	7.33	PASS
176	95 - 101% of 174	95.6	PASS
177	5 - 9% of 176	6.52	PASS

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Lab File ID:	1227TUN1.D	Injection Date:	12/27/13
Instrument ID:	MS-VOA6	Injection Time:	05:49
Sequence:	3L36510	Lab Sample ID:	3L36510-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15 - 40% of 95	27.3	PASS
75	30 - 60% of 95	56.1	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.02	PASS
173	Less than 2% of 174	0	PASS
174	50 - 200% of 95	70.3	PASS
175	5 - 9% of 174	6.63	PASS
176	95 - 101% of 174	96.8	PASS
177	5 - 9% of 176	6.25	PASS

ANALYSIS SEQUENCE SUMMARY

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L35205	Instrument:	MS-VOA6
Calibration:	3352001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	3L35205-TUN1	1216TUN1.D	12/16/13 06:17
Cal Standard	3L35205-CAL1	1216CAL1.D	12/16/13 07:39
Cal Standard	3L35205-CAL2	1216CAL2.D	12/16/13 08:07
Cal Standard	3L35205-CAL3	1216CAL3.D	12/16/13 08:35
Cal Standard	3L35205-CAL4	1216CAL4.D	12/16/13 09:02
Cal Standard	3L35205-CAL5	1216CAL5.D	12/16/13 09:30
Cal Standard	3L35205-CAL6	1216CAL6.D	12/16/13 09:57
Cal Standard	3L35205-CAL7	1216CAL7.D	12/16/13 10:25
Cal Standard	3L35205-CAL8	1216CAL8.D	12/16/13 10:52
Cal Standard	3L35205-CAL9	1216CAL9.D	12/16/13 11:20
Initial Cal Check	3L35205-ICV1	1216ICV1.D	12/16/13 12:15

ANALYSIS SEQUENCE SUMMARY

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L36509	Instrument:	MS-VOA6
Calibration:	3352001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	3L36509-TUN1	1224TUN1.D	12/24/13 06:57
Calibration Check	3L36509-CCV1	1224CCV1.D	12/24/13 07:24
LCS	3L24002-BS1	1224LCS1.D	12/24/13 07:53
Blank	3L24002-BLK1	1224BLK1.D	12/24/13 09:43
Trip Blank #02692	1312151-08	1215108.D	12/24/13 10:38
MW-108-121813	1312151-01	1215101.D	12/24/13 13:51
MW-109-121813	1312151-02	1215102.D	12/24/13 14:19
MW-109S-121813	1312151-03	1215103.D	12/24/13 14:46
MW-116-121813	1312151-05	1215105.D	12/24/13 15:14
MW-108S-121813	1312151-04	1215104D.D	12/24/13 17:04

ANALYSIS SEQUENCE SUMMARY

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L36510	Instrument:	MS-VOA6
Calibration:	3352001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	3L36510-TUN1	1227TUN1.D	12/27/13 05:49
Calibration Check	3L36510-CCV1	1227CCV1.D	12/27/13 06:17
LCS	3L27001-BS1	1227LCS1.D	12/27/13 06:45
Blank	3L27001-BLK1	1227BLK1.D	12/27/13 08:35
MW-110-121813	1312151-06RE1	1215106D.D	12/27/13 13:38
FD-01-121813	1312151-07RE1	1215107D.D	12/27/13 14:06

INTERNAL STANDARD AREA AND RT SUMMARY
SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Sequence: 3L36509
Instrument: MS-VOA6
Calibration: 3352001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (3L36509-CCV1)			Lab File ID: 1224CCV1.D			Analyzed: 12/24/13 07:24			
Fluorobenzene	1239958	7.73	985038	7.76	126	50 - 200	-0.0300	+/-0.50	
Chlorobenzene-d5	580958	10.84	457662	10.87	127	50 - 200	-0.0300	+/-0.50	
1,4-Dichlorobenzene-d4	531746	13.24	401927	13.25	132	50 - 200	-0.0100	+/-0.50	
LCS (3L24002-BS1)			Lab File ID: 1224LCS1.D			Analyzed: 12/24/13 07:53			
Fluorobenzene	1252991	7.74	985038	7.73	127	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	587981	10.85	457662	10.84	128	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	515458	13.23	401927	13.24	128	50 - 200	-0.0100	+/-0.50	
Blank (3L24002-BLK1)			Lab File ID: 1224BLK1.D			Analyzed: 12/24/13 09:43			
Fluorobenzene	1095224	7.73	985038	7.73	111	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	501877	10.84	457662	10.84	110	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	406421	13.24	401927	13.24	101	50 - 200	0.0000	+/-0.50	
Trip Blank #02692 (1312151-08)			Lab File ID: 1215108.D			Analyzed: 12/24/13 10:38			
Fluorobenzene	1075781	7.73	985038	7.73	109	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	496872	10.85	457662	10.84	109	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	398451	13.23	401927	13.24	99	50 - 200	-0.0100	+/-0.50	
MW-108-121813 (1312151-01)			Lab File ID: 1215101.D			Analyzed: 12/24/13 13:51			
Fluorobenzene	1081245	7.73	985038	7.73	110	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	500002	10.84	457662	10.84	109	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	397689	13.24	401927	13.24	99	50 - 200	0.0000	+/-0.50	
MW-109-121813 (1312151-02)			Lab File ID: 1215102.D			Analyzed: 12/24/13 14:19			
Fluorobenzene	1061043	7.73	985038	7.73	108	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	482348	10.85	457662	10.84	105	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	392522	13.23	401927	13.24	98	50 - 200	-0.0100	+/-0.50	
MW-109S-121813 (1312151-03)			Lab File ID: 1215103.D			Analyzed: 12/24/13 14:46			
Fluorobenzene	1059961	7.73	985038	7.73	108	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	498579	10.84	457662	10.84	109	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	391840	13.24	401927	13.24	97	50 - 200	0.0000	+/-0.50	
MW-116-121813 (1312151-05)			Lab File ID: 1215105.D			Analyzed: 12/24/13 15:14			
Fluorobenzene	1034677	7.73	985038	7.73	105	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	482025	10.84	457662	10.84	105	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	390076	13.24	401927	13.24	97	50 - 200	0.0000	+/-0.50	
MW-108S-121813 (1312151-04)			Lab File ID: 1215104D.D			Analyzed: 12/24/13 17:04			
Fluorobenzene	1055562	7.74	985038	7.73	107	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	482738	10.85	457662	10.84	105	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	391032	13.23	401927	13.24	97	50 - 200	-0.0100	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Sequence:	3L36510	Instrument:	MS-VOA6
		Calibration:	3352001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (3L36510-CCV1)			Lab File ID: 1227CCV1.D			Analyzed: 12/27/13 06:17			
Fluorobenzene	1248304	7.74	985038	7.76	127	50 - 200	-0.0200	+/-0.50	
Chlorobenzene-d5	601060	10.85	457662	10.87	131	50 - 200	-0.0200	+/-0.50	
1,4-Dichlorobenzene-d4	538001	13.24	401927	13.25	134	50 - 200	-0.0100	+/-0.50	
LCS (3L27001-BS1)			Lab File ID: 1227LCS1.D			Analyzed: 12/27/13 06:45			
Fluorobenzene	1289812	7.74	985038	7.74	131	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	593098	10.85	457662	10.85	130	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	547198	13.24	401927	13.24	136	50 - 200	0.0000	+/-0.50	
Blank (3L27001-BLK1)			Lab File ID: 1227BLK1.D			Analyzed: 12/27/13 08:35			
Fluorobenzene	1120821	7.74	985038	7.74	114	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	516328	10.85	457662	10.85	113	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	387986	13.24	401927	13.24	97	50 - 200	0.0000	+/-0.50	
MW-110-121813 (1312151-06RE1)			Lab File ID: 1215106D.D			Analyzed: 12/27/13 13:38			
Fluorobenzene	1067201	7.74	985038	7.74	108	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	492482	10.85	457662	10.85	108	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	399340	13.25	401927	13.24	99	50 - 200	0.0100	+/-0.50	
FD-01-121813 (1312151-07RE1)			Lab File ID: 1215107D.D			Analyzed: 12/27/13 14:06			
Fluorobenzene	1045188	7.74	985038	7.74	106	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	497647	10.85	457662	10.85	109	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	387856	13.24	401927	13.24	96	50 - 200	0.0000	+/-0.50	

Note: As indicated by QSM 4.2 table F-4, internal standard retention times are evaluated to the continuing calibration verification rather than the midpoint of the initial calibration curve. Reference DoD QSM F-4 tables for RTW establishment: "Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used." and the following page for technical explanation on the use of daily CCV retention times in lieu of the ICAL midpoint standard: "Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (such as column clipping).

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Acetone	1	~~0.3288185~~	2	0.2220273	4	0.1623286	10	0.1481551	20	0.1274897	100	0.1233507
Acetonitrile	5	5.602495E-02	10	4.919139E-02	20	3.879023E-02	50	4.228191E-02	100	3.906914E-02	500	3.957251E-02
Acrolein	2.5	~~5.492273E-02~~	5	3.727502E-02	10	3.186782E-02	25	0.0315535	50	3.491343E-02	250	3.657385E-02
Acrylonitrile	2.5	0.1327456	5	0.1091826	10	0.10551	25	0.1111542	50	0.1039141	250	0.104849
Benzene	0.5	1.001792	1	0.8997419	2	0.9567685	5	0.9800019	10	0.9857401	50	1.041908
Allyl chloride	0.5	0.1290039	1	0.1213898	2	0.1221582	5	0.1235948	10	0.1223193	50	0.1312837
Bromobenzene	0.5	0.8259444	1	0.71856	2	0.7825523	5	0.8274245	10	0.7849139	50	0.8543822
Bromochloromethane	0.5	0.1729479	1	0.1412803	2	0.1584977	5	0.1602483	10	0.1606515	50	0.1742235
Tert-Amyl Methyl Ether	0.5	0.7530665	1	0.6342354	2	0.6689521	5	0.751513	10	0.7494703	50	0.8221681
Bromodichloromethane	0.5	0.4455311	1	0.4058173	2	0.4182092	5	0.4424072	10	0.4469204	50	0.4848844
Bromoform	0.5	0.2992146	1	0.2922096	2	0.3315837	5	0.3806187	10	0.3749049	50	0.4651812
Bromomethane	0.5	0.3337857	1	0.2620238	2	0.2305324	5	0.2638356	10	0.2480899	50	0.237613
Bromofluorobenzene	30	0.9571981	35	0.9655349	40	0.9710133	50	0.982005	60	0.9884479	70	0.9764452
n-Butylbenzene	0.5	1.63077	1	1.530071	2	1.623714	5	1.842372	10	1.927617	50	2.194212
2-Butanone	1	0.1769362	2	0.1475096	4	0.150836	10	0.1426553	20	0.1441023	100	0.148134
sec-Butylbenzene	0.5	2.636033	1	2.256345	2	2.503791	5	2.75357	10	2.930176	50	3.220494
tert-Butylbenzene	0.5	2.127834	1	1.88197	2	2.156601	5	2.359505	10	2.423421	50	2.655347
Carbon disulfide	0.5	0.8624913	1	0.6883061	2	0.764688	5	0.8074891	10	0.8392042	50	0.9107136
Carbon tetrachloride	0.5	0.4284176	1	0.4257079	2	0.4556586	5	0.4740362	10	0.4678455	50	0.5254643
Chlorobenzene	0.5	1.836998	1	1.53932	2	1.674058	5	1.728988	10	1.653791	50	1.774433
Chloroethane	0.5	0.2242158	1	0.1822821	2	0.1660879	5	0.1958606	10	0.1872501	50	0.1878772
Chloroform	0.5	0.7843929	1	0.5799134	2	0.5963625	5	0.6112162	10	0.5784279	50	0.612751
2-Chloroethyl vinyl ether	1	8.099906E-02	2	7.333291E-02	4	8.531739E-02	10	8.280067E-02	20	7.014801E-02	100	7.348515E-02
Chloromethane	0.5	0.4477065	1	0.3323947	2	0.313451	5	0.3592467	10	0.3601449	50	0.3735497
1-Chlorohexane	0.5	0.9288087	1	0.7096853	2	0.6703928	5	0.7042292	10	0.6803893	50	0.7401774
2-Chlorotoluene	0.5	2.297746	1	2.004349	2	2.363496	5	2.400817	10	2.368955	50	2.535951
Chloroprene	0.5	0.6499504	1	0.5868428	2	0.5701908	5	0.6287847	10	0.6589835	50	0.6944669
4-Chlorotoluene	0.5	2.833016	1	2.302249	2	2.627214	5	2.782515	10	2.804322	50	2.97795
Cyclohexane	0.5	0.4220363	1	0.3535059	2	0.3953851	5	0.4415826	10	0.4476266	50	0.4864473
Dibromochloromethane	0.5	0.7035714	1	0.5561912	2	0.6191473	5	0.6766387	10	0.7061886	50	0.7994532
1,2-Dibromo-3-chloropropane	0.5	~~0.1332416~~	1	7.209409E-02	2	0.1074893	5	0.126289	10	0.1173174	50	0.1521664

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
1,2-Dibromoethane (EDB)	0.5	0.6341586	1	0.5156088	2	0.5772478	5	0.6427509	10	0.6161028	50	0.6577304
Dibromomethane	0.5	0.2421995	1	0.1854057	2	0.2130608	5	0.2190477	10	0.2085717	50	0.2175011
1,2-Dichlorobenzene	0.5	1.407292	1	1.184648	2	1.351536	5	1.422387	10	1.369617	50	1.513227
1,3-Dichlorobenzene	0.5	1.428795	1	1.432168	2	1.427206	5	1.480065	10	1.499029	50	1.567131
trans-1,4-Dichloro-2-butene	0.5	~~0.2676352~~	1	0.2518055	2	0.3127859	5	0.3502759	10	0.3212036	50	0.3811003
cis-1,4-Dichloro-2-butene	0.5	0.3198566	1	0.3155188	2	0.3168749	5	0.3477989	10	0.3507495	50	0.4043255
1,4-Dichlorobenzene	0.5	1.707374	1	1.367026	2	1.454231	5	1.524296	10	1.519416	50	1.597998
Dichlorodifluoromethane	0.5	0.4704762	1	0.3875424	2	0.3951523	5	0.3825526	10	0.4779366	50	0.4882398
1,1-Dichloroethane	0.5	0.6215971	1	0.5148204	2	0.5539186	5	0.5739058	10	0.5604445	50	0.5789404
1,2-Dichloroethane	0.5	0.6977377	1	0.6492072	2	0.7149046	5	0.7101144	10	0.67133	50	0.691011
1,1-Dichloroethene	0.5	0.2675797	1	0.2221709	2	0.2395009	5	0.2447506	10	0.2557957	50	0.2570837
cis-1,2-Dichloroethene	0.5	0.2432872	1	0.2485959	2	0.2681966	5	0.2855692	10	0.2791828	50	0.2906336
trans-1,2-Dichloroethene	0.5	0.2581528	1	0.2446824	2	0.2374065	5	0.263039	10	0.2572849	50	0.2639993
1,2-Dichloroethene (total)	1	0.25072	2	0.2466391	4	0.2528015	10	0.2743041	20	0.2682338	100	0.2773164
1,2-Dichloropropane	0.5	0.266347	1	0.2328701	2	0.2608034	5	0.2741643	10	0.267286	50	0.2905274
1,3-Dichloropropane	0.5	0.8342121	1	0.8839789	2	0.9185308	5	0.9486775	10	0.9342751	50	0.9912243
2,2-Dichloropropane	0.5	0.4529276	1	0.4296573	2	0.4538864	5	0.489089	10	0.4749316	50	0.5172111
1,1-Dichloropropene	0.5	0.4012245	1	0.3583529	2	0.392503	5	0.4229588	10	0.424626	50	0.4528363
cis-1,3-Dichloropropene	0.5	0.359601	1	0.3314971	2	0.3875622	5	0.4071793	10	0.4238631	50	0.477862
trans-1,3-Dichloropropene	0.5	0.8971715	1	0.7819362	2	0.9491996	5	0.9869749	10	0.9862184	50	1.126627
Diisopropyl Ether	0.5	1.024054	1	0.9017525	2	0.9641796	5	1.040038	10	1.039067	50	1.112964
1,4-Dioxane	10	2.008661E-03	20	2.044705E-03	40	2.336114E-03	100	2.522071E-03	200	2.143985E-03	1000	2.652047E-03
Ethylbenzene	0.5	2.471944	1	2.214522	2	2.434572	5	2.684476	10	2.758637	50	2.957095
Ethyl tert-Butyl Ether	0.5	0.963577	1	0.8655258	2	0.9727006	5	1.049249	10	1.01616	50	1.116396
Ethyl Methacrylate	0.5	0.6280201	1	0.5561912	2	0.639135	5	0.7033684	10	0.696696	50	0.7859386
Hexachlorobutadiene	0.5	0.5563893	1	0.5156109	2	0.5323706	5	0.5419032	10	0.5247702	50	0.5732651
Hexane	0.5	0.2049994	1	0.196464	2	0.2098027	5	0.2321438	10	0.2439422	50	0.2540686
2-Hexanone	1	0.3953851	2	0.3723189	4	0.3950613	10	0.4464009	20	0.428934	100	0.463153
Iodomethane	0.5	0.3519145	1	0.3424476	2	0.3514375	5	0.3883598	10	0.4235499	50	0.4924456
Isobutyl alcohol	10	6.261655E-03	20	4.24918E-03	40	5.220006E-03	100	5.682173E-03	200	4.898134E-03	1000	5.645641E-03
Isopropylbenzene	0.5	~~2.013914~~	1	1.823319	2	2.181329	5	2.425183	10	2.470393	50	2.749678

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
p-Isopropyltoluene	0.5	2.414284	1	2.089967	2	2.245291	5	2.501381	10	2.570049	50	2.827357
Methacrylonitrile	5	0.22497	10	0.1930065	20	0.2089327	50	0.2237446	100	0.2139761	500	0.2226564
Methylene chloride	0.5	~~0.5828017~~	1	0.3491975	2	0.3288461	5	0.3273941	10	0.2845865	50	0.2872668
Methyl Acetate	0.5	~~0.3857064~~	1	0.3154482	2	0.2903226	5	0.3030329	10	0.2601533	50	0.2434809
Methylcyclohexane	0.5	0.3221109	1	0.2744823	2	0.2967133	5	0.3184141	10	0.3366445	50	0.3560554
Naphthalene	0.5	1.396541	1	1.309217	2	1.336731	5	1.444397	10	1.584445	50	1.887839
Methyl Methacrylate	0.5	0.3092757	1	0.2915724	2	0.3034442	5	0.324452	10	0.3110086	50	0.3413477
4-Methyl-2-pentanone	1	0.2646066	2	0.252653	4	0.2816047	10	0.3064083	20	0.2857459	100	0.309209
Methyl t-Butyl Ether	0.5	0.7599554	1	0.7730025	2	0.7712577	5	0.8224021	10	0.7764854	50	0.8366818
n-Propylbenzene	0.5	3.205478	1	2.985857	2	3.16137	5	3.395684	10	3.540615	50	3.815046
Propionitrile	5	3.860689E-02	10	3.631281E-02	20	3.519208E-02	50	3.953202E-02	100	3.526257E-02	500	3.705665E-02
Styrene	0.5	1.294131	1	1.170637	2	1.364739	5	1.573669	10	1.623073	50	1.83601
1,1,2,2-Tetrachloroethane	0.5	0.7764107	1	0.665799	2	0.7153891	5	0.7611308	10	0.7028783	50	0.7666392
1,1,1,2-Tetrachloroethane	0.5	0.6226685	1	0.562134	2	0.5591843	5	0.6168669	10	0.6211794	50	0.6923942
tert-Butyl alcohol	2.5	3.176149E-02	5	2.457954E-02	10	2.613583E-02	25	2.906846E-02	50	0.0246684	250	0.0253521
Tetrachloroethene	0.5	0.5831615	1	0.531873	2	0.5567103	5	0.5878116	10	0.6088291	50	0.6332623
Toluene	0.5	1.412809	1	1.197301	2	1.319581	5	1.380792	10	1.36182	50	1.44104
1,2,3-Trichlorobenzene	0.5	0.7666192	1	0.5883716	2	0.6407529	5	0.6965532	10	0.7155865	50	0.8062701
1,2,4-Trichlorobenzene	0.5	0.854359	1	0.6807511	2	0.676849	5	0.7072572	10	0.7758474	50	0.8834649
1,1,2-Trichloroethane	0.5	0.3890891	1	0.3958161	2	0.4014425	5	0.4122413	10	0.4019966	50	0.4322855
1,1,1-Trichloroethane	0.5	0.5217442	1	0.4704436	2	0.5074111	5	0.5415151	10	0.5462556	50	0.5666079
Tetrahydrofuran	0.5	1.841877E-02	1	2.506065E-02	2	2.459633E-02	5	2.873582E-02	10	2.212781E-02	50	2.689194E-02
Trichloroethene	0.5	0.2818651	1	0.2674811	2	0.2987899	5	0.3121037	10	0.3107088	50	0.3225856
Trichlorofluoromethane	0.5	0.6398708	1	0.5539193	2	0.5702624	5	0.5984556	10	0.6218806	50	0.6265427
1,2,3-Trichloropropane	0.5	0.1660554	1	0.2371613	2	0.2524576	5	0.2528296	10	0.2191469	50	0.2367786
1,3,5-Trimethylbenzene	0.5	2.30005	1	2.177489	2	2.526539	5	2.600353	10	2.69682	50	2.870595
1,2,4-Trimethylbenzene	0.5	2.253204	1	1.995397	2	2.275653	5	2.6207	10	2.67682	50	2.908348
1,1,2-Trichloro-1,2,2-trifluoroethan	0.5	0.3112336	1	0.2766365	2	0.2852565	5	0.3025787	10	0.3143801	50	0.3104713
Vinyl chloride	0.5	0.3408922	1	0.2999738	2	0.310551	5	0.3231103	10	0.3283657	50	0.3495405
m,p-Xylene	1	2.246943	2	1.869453	4	2.121209	10	2.292826	20	2.219465	100	2.419415
o-Xylene	0.5	2.076086	1	1.943112	2	2.221894	5	2.375454	10	2.334007	50	2.506241

INITIAL CALIBRATION DATA

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Vinyl acetate	1	0.7117693	2	0.6064282	4	0.6582203	10	0.7077768	20	0.6245841	100	0.7046624
Xylenes (total)	1.5	2.189991	3	1.894006	6	2.15477	15	2.320369	30	2.257646	150	2.448357
Dibromofluoromethane	30	0.3511555	35	0.3518626	40	0.348243	50	0.3572767	60	0.3526151	70	0.3506151
1,2-Dichloroethane-d4	30	6.416354E-02	35	6.463041E-02	40	6.380276E-02	50	6.416572E-02	60	6.290977E-02	70	6.569801E-02
Toluene-d8	30	2.080908	35	2.05466	40	2.096888	50	2.098553	60	2.104103	70	2.099524
tert-Amyl alcohol	2.5	1.535864E-02	5	1.235799E-02	10	1.185063E-02	25	1.453703E-02	50	1.333665E-02	250	1.598225E-02
tert-Amyl ethyl ether	0.5	0.7149237	1	0.6502484	2	0.6871218	5	0.7644553	10	0.7736503	50	0.8430522
1,3,5-Trichlorobenzene	0.5	0.9123402	1	0.7463691	2	0.8448275	5	0.8628449	10	0.8558897	50	0.9772468
Diethyl ether	0.5	0.264099	1	0.211723	2	0.2517096	5	0.2439819	10	0.2473803	50	0.245608

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Acetone	200	0 1223536	300	0 1242457	400	0 1203613						
Acetonitrile	1000	4 048689E-02	1500	4 303058E-02	2000	4 536802E-02						
Acrolein	500	3 837757E-02	750	3 912383E-02	1000	4 368877E-02						
Acrylonitrile	500	0 1058304	750	0 1103694	1000	0 1157639						
Benzene	100	1 045684	150	1 069117	200	1 100555						
Allyl chloride	100	0 1301861	150	0 1353574	200	0 1344522						
Bromobenzene	100	0 8347792	150	0 8609046	200	0 8587283						
Bromochloromethane	100	0 1721562	150	0 1718145	200	0 1726678						
Tert-Amyl Methyl Ether	100	0 8485488	150	0 8724162	200	0 8822091						
Bromodichloromethane	100	0 4857391	150	0 4830007	200	0 4777352						
Bromoform	100	0 4940723	150	0 5233153	200	0 5206683						
Bromomethane	100	0 2458489	150	0 2511362	200	0 2472115						
Bromofluorobenzene	30	0 954001	30	0 9524235	30	0 9466962						
n-Butylbenzene	100	2 195223	150	2 239683	200	2 210941						
2-Butanone	200	0 1517842	300	0 1519968	400	0 1574109						
sec-Butylbenzene	100	3 141262	150	3 247052	200	3 0715						
tert-Butylbenzene	100	2 599745	150	2 678873	200	2 649429						
Carbon disulfide	100	0 8828894	150	0 941503	200	0 9613434						
Carbon tetrachloride	100	0 5002427	150	0 5065613	200	0 4899897						
Chlorobenzene	100	1 78377	150	1 890187	200	1 876812						
Chloroethane	100	0 1983627	150	0 2050283	200	0 2033424						
Chloroform	100	0 5957633	150	0 5961112	200	0 5820782						
2-Chloroethyl vinyl ether	200	7 136481E-02	300	8 930096E-02	400	8 148637E-02						
Chloromethane	100	0 3895644	150	0 3950223	200	0 3922326						
1-Chlorohexane	100	0 7278216	150	0 7782844	200	0 7752522						
2-Chlorotoluene	100	2 46575	150	2 534251	200	2 433013						
Chloroprene	100	0 6591449	150	0 6663138	200	0 6694291						
4-Chlorotoluene	100	2 921919	150	2 95303	200	2 872079						
Cyclohexane	100	0 4510599	150	0 477335	200	0 495946						
Dibromochloromethane	100	0 8234533	150	0 8620765	200	0 8459628						
1,2-Dibromo-3-chloropropane	100	0 1596723	150	0 1658598	200	0 173507						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
1,2-Dibromoethane (EDB)	100	0 663114	150	0 6958268	200	0 6866003						
Dibromomethane	100	0 2167777	150	0 2146884	200	0 2170703						
1,2-Dichlorobenzene	100	1 513378	150	1 558144	200	1 528831						
1,3-Dichlorobenzene	100	1 564907	150	1 579102	200	1 598892						
trans-1,4-Dichloro-2-butene	100	0 3797488	150	0 3968828	200	0 3748107						
cis-1,4-Dichloro-2-butene	100	0 4071157	150	0 4301267	200	0 4068888						
1,4-Dichlorobenzene	100	1 591644	150	1 624969	200	1 62976						
Dichlorodifluoromethane	100	0 4434886	150	0 4398639	200	0 4336788						
1,1-Dichloroethane	100	0 5680167	150	0 576059	200	0 5821218						
1,2-Dichloroethane	100	0 6743237	150	0 6614162	200	0 6371142						
1,1-Dichloroethene	100	0 2497366	150	0 2631636	200	0 2638804						
cis-1,2-Dichloroethene	100	0 2899578	150	0 2937441	200	0 2938337						
trans-1,2-Dichloroethene	100	0 2577781	150	0 2655436	200	0 2695976						
1,2-Dichloroethene (total)	200	0 273868	300	0 2796439	400	0 2817156						
1,2-Dichloropropane	100	0 2951371	150	0 3028902	200	0 303376						
1,3-Dichloropropane	100	0 9828179	150	1 01845	200	1 021113						
2,2-Dichloropropane	100	0 4978559	150	0 5065538	200	0 4904188						
1,1-Dichloropropene	100	0 4292606	150	0 4402576	200	0 4435662						
cis-1,3-Dichloropropene	100	0 4898485	150	0 4880797	200	0 4936149						
trans-1,3-Dichloropropene	100	1 157612	150	1 20862	200	1 188933						
Diisopropyl Ether	100	1 111236	150	1 135147	200	1 153771						
1,4-Dioxane	2000	2 79041E-03	3000	2 808772E-03	4000	2 95784E-03						
Ethylbenzene	100	2 972394	150	3 127638	200	2 970953						
Ethyl tert-Butyl Ether	100	1 11604	150	1 124914	200	1 132971						
Ethyl Methacrylate	100	0 8139891	150	0 8582517	200	~~0 889472~~						
Hexachlorobutadiene	100	0 5576849	150	0 5798926	200	0 5687879						
Hexane	100	0 2336751	150	0 2502461	200	0 2584357						
2-Hexanone	200	0 4644608	300	0 5025928	400	0 5090106						
Iodomethane	100	0 4981459	150	0 5237961	200	0 5335033						
Isobutyl alcohol	2000	5 873728E-03	3000	6 344857E-03	4000	6 877599E-03						
Isopropylbenzene	100	2 688822	150	2 860662	200	2 784206						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
p-Isopropyltoluene	100	2 802304	150	2 871013	200	2 800058						
Methacrylonitrile	1000	0 223612	1500	0 2295319	2000	0 2297651						
Methylene chloride	100	0 2815487	150	0 2842341	200	0 289209						
Methyl Acetate	100	0 2417526	150	0 2459678	200	0 2563304						
Methylcyclohexane	100	0 329101	150	0 3514488	200	0 3631279						
Naphthalene	100	2 104761	150	2 135807	200	2 27305						
Methyl Methacrylate	100	0 3472788	150	0 3568722	200	0 3612607						
4-Methyl-2-pentanone	200	0 31566	300	0 3235698	400	0 3336355						
Methyl t-Butyl Ether	100	0 8371678	150	0 8593533	200	0 8713245						
n-Propylbenzene	100	3 747354	150	3 8915	200	3 449316						
Propionitrile	1000	3 713059E-02	1500	3 857757E-02	2000	4 502207E-02						
Styrene	100	1 875727	150	1 962025	200	1 989463						
1,1,2,2-Tetrachloroethane	100	0 7527225	150	0 7735203	200	0 7847629						
1,1,1,2-Tetrachloroethane	100	0 7042877	150	0 7302072	200	0 7187477						
tert-Butyl alcohol	500	2 495374E-02	750	2 620211E-02	1000	2 588372E-02						
Tetrachloroethene	100	0 6199359	150	0 661779	200	0 6570152						
Toluene	100	1 470023	150	1 534846	200	1 566377						
1,2,3-Trichlorobenzene	100	0 8351867	150	0 854558	200	0 8671405						
1,2,4-Trichlorobenzene	100	0 9129762	150	0 9340574	200	0 9307971						
1,1,2-Trichloroethane	100	0 4319802	150	0 4566432	200	0 458466						
1,1,1-Trichloroethane	100	0 5293447	150	0 5396075	200	0 5219224						
Tetrahydrofuran	100	2 769061E-02	150	2 782133E-02	200	2 897638E-02						
Trichloroethene	100	0 3174289	150	0 3209899	200	0 3173508						
Trichlorofluoromethane	100	0 5773918	150	0 5890049	200	0 5715509						
1,2,3-Trichloropropane	100	0 2312847	150	0 2404587	200	0 2354357						
1,3,5-Trimethylbenzene	100	2 832287	150	2 864537	200	2 798373						
1,2,4-Trimethylbenzene	100	2 889999	150	2 913238	200	2 90222						
1,1,2-Trichloro-1,2,2-trifluoroethan	100	0 2862736	150	0 2997365	200	0 3023734						
Vinyl chloride	100	0 3502053	150	0 3647242	200	0 3559123						
m,p-Xylene	200	2 452378	300	2 344619	400	1 965535						
o-Xylene	100	2 535753	150	2 586349	200	2 602022						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF	ug/L	RF
Vinyl acetate	200	0 7176122	300	0 7803305	400	0 784598						
Xylenes (total)	300	2 480169	450	2 425196	600	2 177697						
Dibromofluoromethane	30	0 3394245	30	0 3340694	30	0 3306909						
1,2-Dichloroethane-d4	30	6 086263E-02	30	6 184593E-02	30	6 174716E-02						
Toluene-d8	30	2 101308	30	2 130443	30	2 130386						
tert-Amyl alcohol	500	0 0167918	750	1 784867E-02	1000	1 918408E-02						
tert-Amyl ethyl ether	100	0 855408	150	0 8698864	200	0 8717509						
1,3,5-Trichlorobenzene	100	0 9946224	150	1 015757	200	1 01148						
Diethyl ether	100	0 2546247	150	0 2726478	200	0 2723049						

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Acetone	0 143789	24 31662	3 59125	0 1787929	0 999671		0 995	
Acetonitrile	4 375729E-02	13 03298	3 666667	0 5783599			15	
Acrolein	3 667172E-02	10 85392	3 475	0 1539715			15	
Acrylonitrile	0 1110355	8 081635	4 42	0 1595104			15	
Benzene	1 009034	6 121714	7 485555	7 189717E-02			15	
Allyl chloride	0 1277495	4 298736	4 487778	9 646297E-02			15	
Bromobenzene	0 8164655	5 724375	12 21778	3 150273E-02			15	
Bromochloromethane	0 1649431	6 610323	6 578889	4 857425E-02			15	
Tert-Amyl Methyl Ether	0 7758422	11 2879	7 685556	0 0694881			15	
Bromodichloromethane	0 4544716	6 611337	8 474444	6 333754E-02			15	
Bromoform	0 4090854	22 79818	11 62444	4 373709E-02		0 9995946	SPCC (0 1)	
Bromomethane	0 2577863	11 77635	2 671111	0 1253754			15	
Bromofluorobenzene	0 9659739	1 497042	12 05778	2 916133E-02			15	
n-Butylbenzene	1 932734	14 92743	13 64556	3 968718E-02			15	
2-Butanone	0 1523739	6 709003	6 051111	5 124335E-02			15	
sec-Butylbenzene	2 862247	12 11066	13 10556	3 988223E-02			15	
tert-Butylbenzene	2 392525	11 89966	12 87667	4 356942E-02			15	
Carbon disulfide	0 8509587	10 26425	4 571111	7 083462E-02			15	
Carbon tetrachloride	0 4748804	7 229955	7 452222	6 084384E-02			15	
Chlorobenzene	1 750929	6 53941	10 90222	3 945996E-02			SPCC (0 3)	
Chloroethane	0 1944786	8 41338	2 8	9 061371E-03			15	
Chloroform	0 6152241	10 50876	6 554445	8 215545E-02			CCC (30)	
2-Chloroethyl vinyl ether	7 869282E-02	8 630171	8 84	5 305915E-02			15	
Chloromethane	0 3737014	10 47359	2 102222	0 2083576			SPCC (0 1)	
1-Chlorohexane	0 7461157	10 46423	10 87667	4 793572E-02			15	
2-Chlorotoluene	2 378259	6 762953	12 43556	4 278261E-02			15	
Chloroprene	0 6426785	6 29916	5 85	8 738947E-02			15	
4-Chlorotoluene	2 786033	7 533473	12 50222	3 551636E-02			15	
Cyclohexane	0 4412139	10 33837	7 381111	4 442025E-02			15	
Dibromochloromethane	0 7325203	14 56001	10 14	5 259225E-02			15	
1,2-Dibromo-3-chloropropane	0 1342994	25 85084	14 24125	1 845794E-02		0 9999589	0 99	
1,2-Dibromoethane (EDB)	0 6321267	8 949404	10 34889	2 811125E-02			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Dibromomethane	0 2149248	6 764273	8 405555	5 955256E-02			15	
1,2-Dichlorobenzene	1 427673	8 235468	13 60111	1 929657E-02			15	
1,3-Dichlorobenzene	1 508588	4 655512	13 19333	3 685081E-02			15	
trans-1,4-Dichloro-2-butene	0 3460767	13 9858	12 02125	2 376142E-02			15	
cis-1,4-Dichloro-2-butene	0 3665839	12 42429	11 70889	2 758372E-02			15	
1,4-Dichlorobenzene	1 557413	6 600556	13 28222	3 724333E-02			15	
Dichlorodifluoromethane	0 4354368	9 122488	1 902222	0 2317774			15	
1,1-Dichloroethane	0 5699805	4 9389	5 59	1 317553E-02			SPCC (0 1)	
1,2-Dichloroethane	0 6785732	3 962158	7 318889	4 316269E-02			15	
1,1-Dichloroethene	0 251518	5 710461	4 04	0 0136054			CCC (30)	
cis-1,2-Dichloroethene	0 2770001	7 01021	6 301111	0 1244704			15	
trans-1,2-Dichloroethene	0 2574982	4 009072	5 204444	0 1000304			15	
1,2-Dichloroethene (total)	0 2672492	5 064489	6 301111	0 1244704			15	
1,2-Dichloropropane	0 2770446	8 371838	8 297778	4 797973E-02			CCC (30)	
1,3-Dichloropropane	0 9481422	6 617396	9 883334	4 963371E-02			15	
2,2-Dichloropropane	0 4791702	5 979964	6 406667	7 735277E-02			15	
1,1-Dichloropropene	0 4183984	7 092991	7 333333	6 658381E-02			15	
cis-1,3-Dichloropropene	0 4287898	14 35212	9 045556	5 672472E-02			15	
trans-1,3-Dichloropropene	1 031477	14 22543	9 521111	3 532554E-02			15	
Diisopropyl Ether	1 053579	7 930613	5 972222	7 036451E-02			15	
1,4-Dioxane	2 473845E-03	14 35623	8 46	6 046944E-02			15	
Ethylbenzene	2 73247	11 19746	11 05	4 248291E-02			CCC (30)	
Ethyl tert-Butyl Ether	1 039726	8 928137	6 436667	7 972155E-02			15	
Ethyl Methacrylate	0 7101988	14 49481	9 71375	5 660601E-02			15	
Hexachlorobutadiene	0 550075	4 107061	15 60111	2 482048E-02			15	
Hexane	0 2315308	9 833396	5 795556	9 331608E-02			15	
2-Hexanone	0 4419242	10 89205	9 825555	0 0546362			15	
Iodomethane	0 4339556	18 14902	4 233333	0 1187631		0 9999163	0 99	
Isobutyl alcohol	5 672553E-03	14 10708	6 668889	0 1166975			15	
Isopropylbenzene	2 497949	14 15158	11 94875	2 108918E-02			15	
p-Isopropyltoluene	2 569078	10 91057	13 24333	3 673612E-02			15	
Methacrylonitrile	0 2189106	5 409314	6 221111	0 2473932			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Methylene chloride	0 3040354	8 770955	4 5325	0 103154			15	
Methyl Acetate	0 2695611	10 7981	4 40625	0 1179939			15	
Methylcyclohexane	0 3275665	8 778339	8 62	0 0571821			15	
Naphthalene	1 719199	22 24028	15 46556	3 240156E-02		0 9997636	0 99	
Methyl Methacrylate	0 3273903	7 688068	8 436666	0 0549356			15	
4-Methyl-2-pentanone	0 2970103	9 231002	8 977777	4 607543E-02			15	
Methyl t-Butyl Ether	0 8119589	5 200309	5 214444	0 1008507			15	
n-Propylbenzene	3 465802	9 032782	12 35556	4 197886E-02			15	
Propionitrile	3 807703E-02	7 888361	5 771111	0 1347432			15	
Styrene	1 632164	18 62952	11 52444	3 893919E-02		0 99993	0 99	
1,1,2,2-Tetrachloroethane	0 7443614	5 434138	11 87333	4 045401E-02			SPCC (0 3)	
1,1,1,2-Tetrachloroethane	0 6475189	10 14053	10 94778	4 148684E-02			15	
tert-Butyl alcohol	2 651171E-02	9 008457	4 22	0 1165554			15	
Tetrachloroethene	0 6044864	7 261824	10 25111	0 0318367			15	
Toluene	1 409399	7 980239	9 52	5 230498E-02			CCC (30)	
1,2,3-Trichlorobenzene	0 7523376	13 07447	15 75222	4 246755E-02			15	
1,2,4-Trichlorobenzene	0 8173732	13 23476	15 31444	3 697279E-02			15	
1,1,2-Trichloroethane	0 4199956	6 177849	9 674445	5 662562E-02			15	
1,1,1-Trichloroethane	0 5272058	5 17292	7 114444	7 249428E-02			15	
Tetrahydrofuran	2 559107E-02	13 61588	6 771111	5 194914E-02			15	
Trichloroethene	0 3054782	6 269524	8 251111	3 955365E-02			15	
Trichlorofluoromethane	0 5943199	4 953716	3 277778	0 2033991			15	
1,2,3-Trichloropropane	0 2301787	11 35989	11 99889	2 882502E-02			15	
1,3,5-Trimethylbenzene	2 629671	9 618818	12 53444	4 630965E-02			15	
1,2,4-Trimethylbenzene	2 603953	13 34361	12 90778	2 942101E-02			15	
1,1,2-Trichloro-1,2,2-trifluoroethane	0 2987711	4 416668	4 121111	8 230966E-02			15	
Vinyl chloride	0 3359195	6 488497	2 25	0 2221082			CCC (30)	
m,p-Xylene	2 214649	8 923809	11 16444	4 374209E-02			15	
o-Xylene	2 353435	9 92063	11 55333	4 660331E-02			15	
Vinyl acetate	0 6995535	8 801438	5 672222	7 439906E-02			15	
Xylenes (total)	2 260911	8 149375	11 55333	4 660331E-02			15	
Dibromofluoromethane	0 346217	2 658453	6 73	6 522505E-03			15	

INITIAL CALIBRATION DATA (Continued)

SW8260B

Laboratory: Empirical Laboratories, LLC
SDG: 1312151
Client: CH2M Hill, Inc.
Project: St. Louis Ordnance Plant
Calibration: 3352001
Instrument: MS-VOA6
Matrix: Water
Calibration Dates: 12/16/13 7:39 12/16/13 11:20

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
1,2-Dichloroethane-d4	6 331399E-02	2 490146	7 225555	7 114916E-02			15	
Toluene-d8	2 099642	1 104215	9 441111	3 858844E-02			15	
tert-Amyl alcohol	1 524975E-02	16 26929	6 944444	7 635195E-02		0 9999426	0 99	
tert-Amyl ethyl ether	0 7811663	10 72246	8 568889	3 499845E-02			15	
1,3,5-Trichlorobenzene	0 9134864	10 18401	14 76111	1 996582E-02			15	
Diethyl ether	0 2515644	7 355314	3 695556	0 1427643			15	

INITIAL CALIBRATION CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Instrument ID:	MS-VOA6	Calibration:	3352001
Lab File ID:	1216ICV1.D	Calibration Date:	12/16/13 07:39
Sequence:	3L35205	Injection Date:	12/16/13
Lab Sample ID:	3L35205-ICV1	Injection Time:	12:15

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN (#)	ICV	LIMIT (#)
Benzene	A	50.00	52.33	1.009034	1.056002		4.7	20
Carbon tetrachloride	A	50.00	49.91	0.4748804	0.4740707		-0.2	20
Chloroform	A	50.00	46.69	0.6152241	0.5745107		-6.6	20
1,2-Dichloroethane	A	50.00	46.97	0.6785732	0.6374698		-6.1	20
cis-1,2-Dichloroethene	A	50.00	52.26	0.2770001	0.2894938		4.5	20
trans-1,2-Dichloroethene	A	50.00	51.74	0.2574982	0.2664364		3.5	20
Methylene chloride	A	50.00	46.79	0.3040354	0.2845066		-6.4	20
Naphthalene	Q	50.00	53.34	1.719199	2.075041		6.7	20
1,1,2,2-Tetrachloroethane	A	50.00	53.94	0.7443614	0.8030801	0.3	7.9	20
1,1,1,2-Tetrachloroethane	A	50.00	53.34	0.6475189	0.6907515		6.7	20
Tetrachloroethene	A	50.00	52.93	0.6044864	0.6398722		5.9	20
1,1,2-Trichloroethane	A	50.00	55.19	0.4199956	0.463585		10.4	20
Trichloroethene	A	50.00	51.10	0.3054782	0.3122094		2.2	20
Vinyl chloride	A	50.00	51.75	0.3359195	0.3476741		3.5	20
Bromofluorobenzene	A	30.00	29.52	0.9659739	0.9504561		-1.6	20
Dibromofluoromethane	A	30.00	28.26	0.346217	0.3261409		-5.8	20
1,2-Dichloroethane-d4	A	30.00	29.62	6.331399E-02	6.250282E-02		-1.3	20
Toluene-d8	A	30.00	30.76	2.099642	2.153026		2.5	20

CONTINUING CALIBRATION CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Instrument ID:	MS-VOA6	Calibration:	3352001
Lab File ID:	1224CCV1.D	Calibration Date:	12/16/13 07:39
Sequence:	3L36509	Injection Date:	12/24/13
Lab Sample ID:	3L36509-CCV1	Injection Time:	07:24

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Benzene	A	100.0	99.74	1.009034	1.006393		-0.3	20
Carbon tetrachloride	A	100.0	98.93	0.4748804	0.4698041		-1.1	20
Chloroform	A	100.0	90.30	0.6152241	0.555547		-9.7	20
1,2-Dichloroethane	A	100.0	93.61	0.6785732	0.6352067		-6.4	20
cis-1,2-Dichloroethene	A	100.0	103.4	0.2770001	0.286387		3.4	20
trans-1,2-Dichloroethene	A	100.0	98.57	0.2574982	0.2538071		-1.4	20
Methylene chloride	A	100.0	87.26	0.3040354	0.265306		-12.7	20
Naphthalene	Q	100.0	99.85	1.719199	2.050569		-0.2	20
1,1,2,2-Tetrachloroethane	A	100.0	101.0	0.7443614	0.7517106	0.3	1.0	20
1,1,1,2-Tetrachloroethane	A	100.0	101.4	0.6475189	0.6563354		1.4	20
Tetrachloroethene	A	100.0	99.02	0.6044864	0.5985381		-1.0	20
1,1,2-Trichloroethane	A	100.0	103.5	0.4199956	0.4345677		3.5	20
Trichloroethene	A	100.0	97.97	0.3054782	0.2992645		-2.0	20
Vinyl chloride	A	100.0	92.29	0.3359195	0.3100138		-7.7	20
Bromofluorobenzene	A	30.00	30.70	0.9659739	0.9886532		2.3	20
Dibromofluoromethane	A	30.00	29.12	0.346217	0.3360356		-2.9	20
1,2-Dichloroethane-d4	A	30.00	30.48	6.331399E-02	6.432718E-02		1.6	20
Toluene-d8	A	30.00	29.39	2.099642	2.056742		-2.0	20

CONTINUING CALIBRATION CHECK

SW8260B

Laboratory:	Empirical Laboratories, LLC	SDG:	1312151
Client:	CH2M Hill, Inc.	Project:	St. Louis Ordnance Plant
Instrument ID:	MS-VOA6	Calibration:	3352001
Lab File ID:	1227CCV1.D	Calibration Date:	12/16/13 07:39
Sequence:	3L36510	Injection Date:	12/27/13
Lab Sample ID:	3L36510-CCV1	Injection Time:	06:17

		CONC. (ug/L)		RESPONSE FACTOR			% DIFF / DRIFT	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Benzene	A	100.0	101.3	1.009034	1.021926		1.3	20
Carbon tetrachloride	A	100.0	100.1	0.4748804	0.475358		0.1	20
Chloroform	A	100.0	90.26	0.6152241	0.5553051		-9.7	20
1,2-Dichloroethane	A	100.0	92.78	0.6785732	0.6295673		-7.2	20
cis-1,2-Dichloroethene	A	100.0	101.9	0.2770001	0.2822906		1.9	20
trans-1,2-Dichloroethene	A	100.0	98.64	0.2574982	0.2539975		-1.4	20
Methylene chloride	A	100.0	89.23	0.3040354	0.271294		-10.8	20
Naphthalene	Q	100.0	93.79	1.719199	1.913375		-6.2	20
1,1,2,2-Tetrachloroethane	A	100.0	98.82	0.7443614	0.7355852	0.3	-1.2	20
1,1,1,2-Tetrachloroethane	A	100.0	99.71	0.6475189	0.6456499		-0.3	20
Tetrachloroethene	A	100.0	97.09	0.6044864	0.5868802		-2.9	20
1,1,2-Trichloroethane	A	100.0	100.8	0.4199956	0.4231919		0.8	20
Trichloroethene	A	100.0	98.37	0.3054782	0.3005117		-1.6	20
Vinyl chloride	A	100.0	93.42	0.3359195	0.3138079		-6.6	20
Bromofluorobenzene	A	30.00	29.53	0.9659739	0.9509616		-1.6	20
Dibromofluoromethane	A	30.00	29.47	0.346217	0.340067		-1.8	20
1,2-Dichloroethane-d4	A	30.00	30.21	6.331399E-02	0.0637497		0.7	20
Toluene-d8	A	30.00	29.68	2.099642	2.077397		-1.1	20

HOLDING TIME SUMMARY

SW8260B

Laboratory: Empirical Laboratories, LLC SDG: 1312151

Client: CH2M Hill, Inc. Project: St. Louis Ordnance Plant

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
MW-108-121813	12/18/13 09:36	12/19/13 09:25	12/24/13 13:51	N/A	14.00	12/24/13 13:51	6.18	14.00	
MW-109-121813	12/18/13 10:00	12/19/13 09:25	12/24/13 14:19	N/A	14.00	12/24/13 14:19	6.18	14.00	
MW-109S-121813	12/18/13 10:40	12/19/13 09:25	12/24/13 14:46	N/A	14.00	12/24/13 14:46	6.17	14.00	
MW-108S-121813	12/18/13 10:48	12/19/13 09:25	12/24/13 17:04	N/A	14.00	12/24/13 17:04	6.26	14.00	
MW-116-121813	12/18/13 12:52	12/19/13 09:25	12/24/13 15:14	N/A	14.00	12/24/13 15:14	6.10	14.00	
MW-110-121813	12/18/13 12:55	12/19/13 09:25	12/27/13 13:38	N/A	14.00	12/27/13 13:38	9.03	14.00	
FD-01-121813	12/18/13 13:00	12/19/13 09:25	12/27/13 14:06	N/A	14.00	12/27/13 14:06	9.05	14.00	
Trip Blank #02692	12/18/13 14:00	12/19/13 09:25	12/24/13 10:38	N/A	14.00	12/24/13 10:38	5.86	14.00	

PREPARATION BENCH SHEET

3L24002

Empirical Laboratories, LLC **Printed: 1/8/2014 12:09:00PM**

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments
1312148-01	A	VOC_8260B_REG	12/24/2013	5	5				1	2	EB
1312148-02	B	VOC_8260B_REG	12/24/2013	5	5				1	2	
1312148-03	B	VOC_8260B_REG	12/24/2013	5	5				1	2	
1312148-04	B	VOC_8260B_REG	12/24/2013	5	5				1	2	
1312148-05	B	VOC_8260B_REG	12/24/2013	5	5				1	2	
1312148-06	B	VOC_8260B_REG	12/24/2013	5	5				1	2	
1312148-07	A	VOC_8260B_REG	12/24/2013	5	5				1	2	TB
1312151-01	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312151-02	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312151-03	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312151-04	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required-2X-T/F
1312151-05	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312151-06	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required-50X-T
1312151-07	B	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required-50X-T
1312151-08	A	VOC_8260B_REG	12/24/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312152-01	B	VOC_8260B_REG	12/24/2013	5	5				1	2	IStoICAL-2X-F
1312152-05	B	VOC_8260B_REG	12/24/2013	5	5				1	2	IStoICAL
1312152-07	AA	VOC_8260B_REG	12/24/2013	5	5				1	2	MS/MSD; IStoICAL
3L24002-BLK1		QC	12/24/2013	5	5				1	NA	
3L24002-BS1		QC	12/24/2013	5	5	13L0538		2.5	1	NA	
3L24002-MS1		QC	12/24/2013	5	5	13L0538	1312152-07	2.5	1	NA	
3L24002-MSD1		QC	12/24/2013	5	5	13L0538	1312152-07	2.5	1	NA	

PREPARATION BENCH SHEET

3L24002

Empirical Laboratories, LLC

Printed: 1/8/2014 12:09:00PM

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments

Reagents Used:

Standard	Description
12A0500	Anti-foam-GE_AF72

PREPARATION BENCH SHEET

3L27001

Empirical Laboratories, LLC

Printed: 1/8/2014 2:51:37PM

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments
1312151-06RE1	B	VOC_8260B_REG	12/27/2013	5	5				1	2	Re-extract added 12/27/2013 by ADM-RR 20X lower
1312151-07RE1	B	VOC_8260B_REG	12/27/2013	5	5				1	2	Re-extract added 12/27/2013 by ADM-RR 20X lower
1312152-03	B	VOC_8260B_REG	12/27/2013	5	5				1	2	IStoICAL-2X-M/F
1312152-09	A	VOC_8260B_REG	12/27/2013	5	5				1	2	TB
1312156-01	A	VOC_8260B_REG	12/27/2013	5	5				1	2	TB
1312156-02	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions
1312156-03	B	VOC_8260B_REG	12/27/2013	5	5				1	2	MS/MSD
1312156-04	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-2X-F
1312156-05	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-10X-T
1312156-06	A	VOC_8260B_REG	12/27/2013	5	5				1	2	EB
1312156-07	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-500X-T/F
1312156-08	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-100X-T/F
1312156-09	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-10X-T
1312156-10	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-10X-T
1312156-11	B	VOC_8260B_REG	12/27/2013	5	5				1	2	see versions-2000X-T/F
1312159-01	B	VOC_8260B_REG	12/27/2013	5	5				1	2	See versions. lowMDLs. DIL Approval Required
1312159-07	A	VOC_8260B_REG	12/27/2013	5	5				1	2	TB
1312160-02	B	VOC_8260B_REG	12/27/2013	5	5				1	2	TCL list-2X-heavy foam
3L27001-BLK1		QC	12/27/2013	5	5				1	NA	
3L27001-BS1		QC	12/27/2013	5	5	13L0538		2.5	1	NA	
3L27001-MS1		QC	12/27/2013	5	5	13L0538	1312156-03	2.5	1	NA	
3L27001-MSD1		QC	12/27/2013	5	5	13L0538	1312156-03	2.5	1	NA	

PREPARATION BENCH SHEET

3L27001

Empirical Laboratories, LLC

Printed: 1/8/2014 2:51:37PM

Instrument: VOA6

Matrix: Water **Prepared using: MS - 5030B** **Surrogate used: 13K0592**

Lab Number	Cont ID	Analysis	Prepared	Initial (mL)	Final (mL)	Spike ID	Source ID	ul Spike	ul Surrogate	PH	Extraction Comments

Reagents Used:

Standard	Description
12A0500	Anti-foam-GE_AF72

ANALYTICAL REPORT

For:

St. Louis Ordinance

ASL Report #: N1085

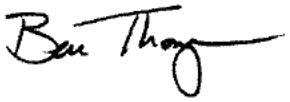
Project ID: 459603.01.VI.RS.01

Attn: Anthony Swierczek/STL

cc:

Shane Lowe/STL

Authorized and Released By:



Laboratory Project Manager

Ben Thompson

(541) 758-0235 ext.23132

February 11, 2014

Accredited in accordance with NELAP:
Oregon (100022)
Arizona (0771)
Louisiana (05031)

Sample Receipt Comments

We certify that the test results meet all NELAP requirements.

Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
N108501	PP02-SG-01-011314	01/13/14 12:25	01/17/14
N108502	PP02-IA-01-011314	01/13/14 12:30	01/17/14
N108503	PP02-IA-01-011314-FD	01/13/14 12:31	01/17/14
N108504	PP02-SG-02-011314	01/13/14 12:33	01/17/14
N108505	PP02-AA-01-011314	01/13/14 12:37	01/17/14

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CH2M HILL
Applied Sciences Laboratory (ASL)
1100 NE Circle Blvd
Suite 300
Corvallis OR 97330
Tel 541.768.3120
Fax 541.752 0276

DOD Data Qualifiers

U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the LOD.
J	The analyte was positively identified but the associated numerical value is below the LOQ.
J	The analyte was positively identified, the quantitation is an estimation.
Q	The data must be evaluated for usability due to deficiencies in the ability to analyze the sample and meet QC criteria.
B	The analyte was found in an associated blank, as well as in the sample.
M	A matrix effect was present.
S	To be applied to all field screening data.
T	Tentatively identified compounds (using GC/MS).
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ANALYSIS METHOD

TO15 SIM

CH2MHILL
Applied Sciences Laboratory (ASL)

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

CASE NARRATIVE
GC/MS VOLATILES ANALYSIS

Lab Name: CH2M HILL ASL **ASL SDG#:** N1085

Project: St. Louis Ordinance **Project #:** 459603.01.VI.RS.01

With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

Method(s):
TO15 SIM

Sample ID	Client ID	Date Collected	Time Collected	Canister ID	Certification Date	Incoming pressure inHG	Incoming pressure torr	Primary Dilution Factor
N108501	PP02-SG-01-011314	1/13/2014	12:25	6L2709A	12/21/2013	4.3	650	1.86
N108502	PP02-IA-01-011314	1/13/2014	12:30	6L2655A	12/21/2013	8.2	551	2.19
N108503	PP02-SG-01-011314-FD	1/13/2014	12:31	6L2635S	12/31/2013	5.2	628	1.91
N108504	PP02-SG-02-011314	1/13/2014	12:33	6L2556S	12/21/2013	2.8	689	1.90
N108505	PP02-AA-01-011314	1/13/2014	12:37	6L2717A	12/23/2013	5.1	630	1.91

DOD
ORGANIC ANALYSES DATA PACKAGE

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

Base/Command: SLOP

Prime Contractor: N/A

Project: St. Louis Ordinance

Field Sample ID	Lab Sample ID
PP02-SG-01-011314	N108501
PP02-IA-01-011314	N108502
PP02-IA-01-011314-FD	N108503
PP02-SG-02-011314	N108504
PP02-AA-01-011314	N108505

Comments:

SAMPLE DATA SUMMARY

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-01-011314 Lab Sample ID: N108501 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.86

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00967	0.0242	0.0484	0.0242		U
Methylene chloride	0.0263	0.0329	0.0657	0.0551		J
trans-1,2-Dichloroethene	0.0150	0.0375	0.0750	**0.126**		
cis-1,2-Dichloroethene	0.0300	0.0375	0.0750	**7.26**		
Chloroform	0.0185	0.0462	0.0924	**8.59**		
1,2-Dichloroethane	0.0153	0.0383	0.0766	0.0383		U
Carbon tetrachloride	0.0238	0.0595	0.119	**0.362**		
Benzene	0.0121	0.0302	0.0605	**0.210**		
Trichloroethene (TCE)	0.0203	0.0508	0.102	**19.2**		
1,1,2-Trichloroethane	0.0206	0.0516	0.103	0.0516		U
Tetrachloroethene (PCE)	0.0257	0.0642	0.128	**5.26**		
1,1,2,2-Tetrachloroethane	0.0260	0.0649	0.130	0.0649		U
Naphthalene	0.0992	0.298	0.298	0.242		J

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-01-011314 Lab Sample ID: N108501 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.86

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	102	70-130	
4-Bromofluorobenzene	110	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314 Lab Sample ID: N108502 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 2.19

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.0114	0.0286	0.0569	0.0286		U
Methylene chloride	0.0310	0.0389	0.0774	**0.615**		
trans-1,2-Dichloroethene	0.0177	0.0444	0.0883	0.0444		U
cis-1,2-Dichloroethene	0.0353	0.0444	0.0883	0.0444		U
Chloroform	0.0218	0.0546	0.109	**0.266**		
1,2-Dichloroethane	0.0180	0.0453	0.0902	0.0688		J
Carbon tetrachloride	0.0280	0.0704	0.140	**0.369**		
Benzene	0.0142	0.0357	0.0712	**1.10**		
Trichloroethene (TCE)	0.0239	0.0601	0.120	0.0896		J
1,1,2-Trichloroethane	0.0243	0.0610	0.122	0.0610		U
Tetrachloroethene (PCE)	0.0302	0.0759	0.151	**0.272**		
1,1,2,2-Tetrachloroethane	0.0306	0.0768	0.153	0.0768		U
Naphthalene	0.117	0.350	0.350	0.199		J

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314 Lab Sample ID: N108502 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 2.19

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	99	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314-FD Lab Sample ID: N108503 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314-FD

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00993	0.0248	0.0497	0.0248		U
Methylene chloride	0.0270	0.0337	0.0675	**0.682**		
trans-1,2-Dichloroethene	0.0154	0.0385	0.0770	0.0385		U
cis-1,2-Dichloroethene	0.0308	0.0385	0.0770	0.0385		U
Chloroform	0.0190	0.0474	0.0949	**0.258**		
1,2-Dichloroethane	0.0157	0.0393	0.0786	0.0688		J
Carbon tetrachloride	0.0244	0.0611	0.122	**0.375**		
Benzene	0.0124	0.0310	0.0621	**1.11**		
Trichloroethene (TCE)	0.0209	0.0522	0.104	0.0847		J
1,1,2-Trichloroethane	0.0212	0.0530	0.106	0.0530		U
Tetrachloroethene (PCE)	0.0264	0.0659	0.132	**0.257**		
1,1,2,2-Tetrachloroethane	0.0267	0.0667	0.133	0.0667		U
Naphthalene	0.102	0.306	0.306	**0.629**		

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314-FD Lab Sample ID: N108503 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314-FD

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	108	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-02-011314 Lab Sample ID: N108504 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-02-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.9

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00988	0.0247	0.0494	0.0247		U
Methylene chloride	0.0269	0.0336	0.0671	**0.114**		
trans-1,2-Dichloroethene	0.0153	0.0383	0.0766	0.0621		J
cis-1,2-Dichloroethene	0.0306	0.0383	0.0766	**0.0984**		
Chloroform	0.0189	0.0472	0.0944	**1.43**		
1,2-Dichloroethane	0.0156	0.0391	0.0782	**0.119**		
Carbon tetrachloride	0.0243	0.0608	0.122	**0.400**		
Benzene	0.0123	0.0309	0.0617	**0.193**		
Trichloroethene (TCE)	0.0208	0.0519	0.104	**0.721**		
1,1,2-Trichloroethane	0.0211	0.0527	0.105	**0.435**		
Tetrachloroethene (PCE)	0.0262	0.0655	0.131	**3.65**		
1,1,2,2-Tetrachloroethane	0.0265	0.0663	0.133	**4.11**		
Naphthalene	0.101	0.304	0.304	0.304		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-02-011314 Lab Sample ID: N108504 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-02-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.9

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	102	70-130	
4-Bromofluorobenzene	109	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-AA-01-011314 Lab Sample ID: N108505 Matrix: AIR

% Solids: 0 Sample Description: PP02-AA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00993	0.0248	0.0497	0.0248		U
Methylene chloride	0.0270	0.0337	0.0675	**0.371**		
trans-1,2-Dichloroethene	0.0154	0.0385	0.0770	0.0385		U
cis-1,2-Dichloroethene	0.0308	0.0385	0.0770	0.0385		U
Chloroform	0.0190	0.0474	0.0949	**0.176**		
1,2-Dichloroethane	0.0157	0.0393	0.0786	0.0659		J
Carbon tetrachloride	0.0244	0.0611	0.122	**0.361**		
Benzene	0.0124	0.0310	0.0621	**1.10**		
Trichloroethene (TCE)	0.0209	0.0522	0.104	0.0524		J
1,1,2-Trichloroethane	0.0212	0.0530	0.106	0.0530		U
Tetrachloroethene (PCE)	0.0264	0.0659	0.132	0.0980		J
1,1,2,2-Tetrachloroethane	0.0267	0.0667	0.133	0.0667		U
Naphthalene	0.102	0.306	0.306	0.306		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-AA-01-011314 Lab Sample ID: N108505 Matrix: AIR

% Solids: 0 Sample Description: PP02-AA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: UG/M3 Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	100	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-01-011314 Lab Sample ID: N108501 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.86

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00372	0.00930	0.0186	0.00930		U
Methylene chloride	0.00744	0.00930	0.0186	0.0156		J
trans-1,2-Dichloroethene	0.00372	0.00930	0.0186	**0.0313**		
cis-1,2-Dichloroethene	0.00744	0.00930	0.0186	**1.800**		
Chloroform	0.00372	0.00930	0.0186	**1.730**		
1,2-Dichloroethane	0.00372	0.00930	0.0186	0.00930		U
Carbon tetrachloride	0.00372	0.00930	0.0186	**0.0566**		
Benzene	0.00372	0.00930	0.0186	**0.0647**		
Trichloroethene (TCE)	0.00372	0.00930	0.0186	**3.510**		
1,1,2-Trichloroethane	0.00372	0.00930	0.0186	0.00930		U
Tetrachloroethene (PCE)	0.00372	0.00930	0.0186	**0.763**		
1,1,2,2-Tetrachloroethane	0.00372	0.00930	0.0186	0.00930		U
Naphthalene	0.0186	0.0558	0.0558	0.0454		J

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-01-011314 Lab Sample ID: N108501 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.86

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	102	70-130	
4-Bromofluorobenzene	110	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314 Lab Sample ID: N108502 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 2.19

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00438	0.011	0.0219	0.011		U
Methylene chloride	0.00876	0.011	0.0219	**0.174**		
trans-1,2-Dichloroethene	0.00438	0.011	0.0219	0.011		U
cis-1,2-Dichloroethene	0.00876	0.011	0.0219	0.011		U
Chloroform	0.00438	0.011	0.0219	**0.0536**		
1,2-Dichloroethane	0.00438	0.011	0.0219	0.0167		J
Carbon tetrachloride	0.00438	0.011	0.0219	**0.0576**		
Benzene	0.00438	0.011	0.0219	**0.340**		
Trichloroethene (TCE)	0.00438	0.011	0.0219	0.0164		J
1,1,2-Trichloroethane	0.00438	0.011	0.0219	0.011		U
Tetrachloroethene (PCE)	0.00438	0.011	0.0219	**0.0395**		
1,1,2,2-Tetrachloroethane	0.00438	0.011	0.0219	0.011		U
Naphthalene	0.0219	0.0657	0.0657	0.0374		J

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314 Lab Sample ID: N108502 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 2.19

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	99	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314-FD Lab Sample ID: N108503 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314-FD

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00382	0.00955	0.0191	0.00955		U
Methylene chloride	0.00764	0.00955	0.0191	**0.193**		
trans-1,2-Dichloroethene	0.00382	0.00955	0.0191	0.00955		U
cis-1,2-Dichloroethene	0.00764	0.00955	0.0191	0.00955		U
Chloroform	0.00382	0.00955	0.0191	**0.0519**		
1,2-Dichloroethane	0.00382	0.00955	0.0191	0.0167		J
Carbon tetrachloride	0.00382	0.00955	0.0191	**0.0586**		
Benzene	0.00382	0.00955	0.0191	**0.343**		
Trichloroethene (TCE)	0.00382	0.00955	0.0191	0.0155		J
1,1,2-Trichloroethane	0.00382	0.00955	0.0191	0.00955		U
Tetrachloroethene (PCE)	0.00382	0.00955	0.0191	**0.0372**		
1,1,2,2-Tetrachloroethane	0.00382	0.00955	0.0191	0.00955		U
Naphthalene	0.0191	0.0573	0.0573	**0.118**		

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-IA-01-011314-FD Lab Sample ID: N108503 Matrix: AIR

% Solids: 0 Sample Description: PP02-IA-01-011314-FD

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	108	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-02-011314 Lab Sample ID: N108504 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-02-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.9

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00380	0.00950	0.019	0.00950		U
Methylene chloride	0.00760	0.00950	0.019	**0.0323**		
trans-1,2-Dichloroethene	0.00380	0.00950	0.019	0.0154		J
cis-1,2-Dichloroethene	0.00760	0.00950	0.019	**0.0244**		
Chloroform	0.00380	0.00950	0.019	**0.287**		
1,2-Dichloroethane	0.00380	0.00950	0.019	**0.0289**		
Carbon tetrachloride	0.00380	0.00950	0.019	**0.0625**		
Benzene	0.00380	0.00950	0.019	**0.0595**		
Trichloroethene (TCE)	0.00380	0.00950	0.019	**0.132**		
1,1,2-Trichloroethane	0.00380	0.00950	0.019	**0.0784**		
Tetrachloroethene (PCE)	0.00380	0.00950	0.019	**0.529**		
1,1,2,2-Tetrachloroethane	0.00380	0.00950	0.019	**0.589**		
Naphthalene	0.019	0.057	0.057	0.057		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-SG-02-011314 Lab Sample ID: N108504 Matrix: AIR

% Solids: 0 Sample Description: PP02-SG-02-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.9

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	102	70-130	
4-Bromofluorobenzene	109	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-AA-01-011314 Lab Sample ID: N108505 Matrix: AIR

% Solids: 0 Sample Description: PP02-AA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00382	0.00955	0.0191	0.00955		U
Methylene chloride	0.00764	0.00955	0.0191	**0.105**		
trans-1,2-Dichloroethene	0.00382	0.00955	0.0191	0.00955		U
cis-1,2-Dichloroethene	0.00764	0.00955	0.0191	0.00955		U
Chloroform	0.00382	0.00955	0.0191	**0.0354**		
1,2-Dichloroethane	0.00382	0.00955	0.0191	0.016		J
Carbon tetrachloride	0.00382	0.00955	0.0191	**0.0564**		
Benzene	0.00382	0.00955	0.0191	**0.338**		
Trichloroethene (TCE)	0.00382	0.00955	0.0191	0.00960		J
1,1,2-Trichloroethane	0.00382	0.00955	0.0191	0.00955		U
Tetrachloroethene (PCE)	0.00382	0.00955	0.0191	0.0142		J
1,1,2,2-Tetrachloroethane	0.00382	0.00955	0.0191	0.00955		U
Naphthalene	0.0191	0.0573	0.0573	0.0573		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: PP02-AA-01-011314 Lab Sample ID: N108505 Matrix: AIR

% Solids: 0 Sample Description: PP02-AA-01-011314

Date Received: 01/17/14 Date Extracted: Date Analyzed: 02/06/14

Concentration Units: PPBV Dilution: 1.91

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	100	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

QC SUMMARY

DOD
ORGANIC ANALYSES DATA SHEET 3 (Part 1)
INITIAL MULTIPOINT CALIBRATION-GC/MS

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

Instrument ID: MSG

Date of Initial Calibration: 02/04/14

Initial Calibration ID: 020414G1

Concentration Units: ppbv

GC Column ID: ZB-624

Initial Calibration Sample IDs:	LEVEL1	LEVEL2	LEVEL3	LEVEL4	LEVEL5	LEVEL6
Initial Calibration File IDs:	LEVEL1.D	LEVEL2.D	LEVEL3.D	LEVEL4.D	LEVEL5.D	LEVEL6.D

Analyte	Std 1	RF 1	Std 2	RF 2	Std 3	RF 3	Std 4	RF 4	Std 5	RF 5	Std 6	RF 6
Bromochloromethane	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000
Vinyl Chloride	004	2 186	01	2 127	02	2 043	05	2 065	25	2 049	5	1 888
Methylene chloride	004	2 984	01	2 780	02	2 754	05	2 491	25	2 400	5	2 170
trans-1,2-Dichloroethene	004	2 997	01	3 033	02	3 295	05	3 239	25	3 250	5	3 141
cis-1,2-Dichloroethene	004	2 395	01	2 384	02	2 456	05	2 533	25	2 571	5	2 758
Chloroform	004	5 003	01	4 770	02	5 047	05	5 070	25	4 890	5	5 145
1,2-Dichloroethane	004	2 846	01	2 938	02	3 492	05	3 335	25	3 244	5	3 383
Carbon tetrachloride	004	2 715	01	2 637	02	3 330	05	3 718	25	3 572	5	3 968
Benzene	02	12 424	05	9 944	25	8 592	5	8 459	2	7 586	5	6 485
1,4-difluorobenzene	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000
Trichloroethene (TCE)	004	0 380	01	0 374	02	0 363	05	0 361	25	0 354	5	0 369
1,1,2-Trichloroethane	004	0 476	01	0 438	02	0 462	05	0 464	25	0 468	5	0 474
Toluene-d8	1	1 159	1	1 140	1	1 176	1	1 184	1	1 195	1	1 171
Tetrachloroethene (PCE)	004	0 525	01	0 508	02	0 538	05	0 530	25	0 509	5	0 515
Chlorobenzene-d5	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000	1	1 000
1,1,2,2-Tetrachloroethane	004	1 357	01	1 397	02	1 384	05	1 378	25	1 326	5	1 365
4-Bromofluorobenzene	1	0 416	1	0 455	1	0 463	1	0 490	1	0 525	1	0 544
Naphthalene	004	1 102	01	1 048	02	0 868	05	0 866	25	0 928	5	1 003

* SPCCs # CCCs

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 3 (Part 1)
INITIAL MULTIPOINT CALIBRATION-GC/MS

Analytical Method: TO15 SIM
SDG #: N1085
Lab Name: CH2M HILL ASL
Contract #: N/A
Instrument ID: MSG
Date of Initial Calibration: 02/04/14
Initial Calibration ID: 020414G1
Concentration Units: ppbv
GC Column ID: ZB-624

Initial Calibration Sample IDs: LEVEL7 LEVEL8
Initial Calibration File IDs: LEVEL7.D LEVEL8.D

Analyte	Std 7	RF 7	Std 8	RF 8	Std 9	RF 9						
Bromochloromethane	1	1 000	1	1 000								
Vinyl Chloride	2	1 701	5	1 582								
Methylene chloride	2	1 833	5	1 612								
trans-1,2-Dichloroethene	2	2 586	5	2 376								
cis-1,2-Dichloroethene	2	2 668	5	2 503								
Chloroform	2	4 578	5	4 067								
1,2-Dichloroethane	2	3 121	5	2 796								
Carbon tetrachloride	2	3 780	5	3 252								
Benzene												
1,4-difluorobenzene	1	1 000	1	1 000								
Trichloroethene (TCE)	2	0 359	5	0 352								
1,1,2-Trichloroethane	2	0 461	5	0 469								
Toluene-d8	1	1 217	1	1 345								
Tetrachloroethene (PCE)	2	0 497	5	0 515								
Chlorobenzene-d5	1	1 000	1	1 000								
1,1,2,2-Tetrachloroethane	2	1 240	5	1 105								
4-Bromofluorobenzene	1	0 534	1	0 538								
Naphthalene	2	0 998	5	1 001								

* SPCCs # CCCs

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 3 (Part 2)
INITIAL MULTIPOINT CALIBRATION-GC/MS

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

Instrument ID: MSG

Date of Initial Calibration: 02/04/14

Initial Calibration ID: 020414G1

Concentration Units: ppbv

GC Column ID: ZB-624

Analyte	Curve Type	Ave. RF	%RSD	r	COD	Q
Bromochloromethane	AVG	1.000	0.00			
Vinyl Chloride	AVG	1.955	10 9			
Methylene chloride	AVG	2.378	20 2			
trans-1,2-Dichloroethene	AVG	2.989	11 2			
cis-1,2-Dichloroethene	AVG	2.533	5.14			
Chloroform	AVG	4.821	7.38			
1,2-Dichloroethane	AVG	3.144	8.30			
Carbon tetrachloride	AVG	3.371	14 5			
Benzene	AVG	8.915	23 2			
1,4-difluorobenzene	AVG	1.000	0.00			
Trichloroethene (TCE)	AVG	0.364	2.63			
1,1,2-Trichloroethane	AVG	0.464	2.54			
Toluene-d8	AVG	1.198	5.30			
Tetrachloroethene (PCE)	AVG	0.517	2.53			
Chlorobenzene-d5	AVG	1.000	0.00			
1,1,2,2-Tetrachloroethane	AVG	1.319	7.55			
4-Bromofluorobenzene	AVG	0.496	9.54			
Naphthalene	AVG	0.977	8.57			

* SPCCs # CCCs

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 4
SECOND SOURCE CALIBRATION VERIFICATION

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

Instrument ID: MSG

Initial Calibration ID: 020414G1

2nd Source ID: ICV-0205

Concentration Units: ppbv

GC Column ID: ZB-624

Analyte	Expected	Found	%D	Q
Vinyl Chloride	0.500	0.487	-3	
Methylene chloride	0.500	0.420	-16	
trans-1,2-Dichloroethene	0.500	0.478	-4	
cis-1,2-Dichloroethene	0.500	0.516	3	
Chloroform	0.500	0.498	-0.4	
1,2-Dichloroethane	0.500	0.502	0.3	
Carbon tetrachloride	0.500	0.569	14	
Benzene	0.500	0.456	-9	
Trichloroethene (TCE)	0.500	0.498	-0.4	
1,1,2-Trichloroethane	0.500	0.502	0.3	
Tetrachloroethene (PCE)	0.500	0.505	1.0	
1,1,2,2-Tetrachloroethane	0.500	0.491	-2	
Naphthalene	0.500	0.489	-2	

* SPCCs # CCCs

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 6
BLANKS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Method Blank ID: XB3-0205 Matrix: AIR

Date Extracted: Date Analyzed: 02/05/14 Instrument: MSG

Dilution: 1 Concentration Units: UG/M3

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0156		J
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0312		J
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 6
BLANKS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Method Blank ID: XB3-0205 Matrix: AIR

Date Extracted: Date Analyzed: 02/05/14 Instrument: MSG

Dilution: Concentration Units: UG/M3

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	78	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 7
LABORATORY CONTROL SAMPLE

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

LCS ID: BS2X0205

Concentration Units: UG/M3

Instrument ID: MSG

Date Analyzed: 02/05/14

Analyte	Expected	Found	%R	Control Limits	Q
Naphthalene	2.67	2.64	99	70-130	
Vinyl Chloride	1.30	1.53	117	70-130	
Methylene chloride	1.77	1.78	101	70-130	
trans-1,2-Dichloroethene	2.02	2.15	107	70-130	
cis-1,2-Dichloroethene	2.02	2.22	110	70-130	
Chloroform	2.48	2.56	103	70-130	
1,2-Dichloroethane	2.06	2.12	103	70-130	
Carbon tetrachloride	3.20	3.56	111	70-130	
Benzene	1.62	1.49	92	70-130	
Trichloroethene (TCE)	2.73	2.67	98	70-130	
1,1,2-Trichloroethane	2.77	2.81	101	70-130	
Tetrachloroethene (PCE)	3.45	3.39	98	70-130	
1,1,2,2-Tetrachloroethane	3.49	3.48	100	70-130	

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 7
LABORATORY CONTROL SAMPLE

Analytical Method: TO15 SIM

SDG #: N1085

Lab Name: CH2M HILL ASL

Contract #: N/A

LCS ID: BS2X0205

Concentration Units: UG/M3

Instrument ID: MSG

Date Analyzed: 02/05/14

Analyte	Expected	Found	%R	Control Limits	Q

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	111	70-130	

Internal Standard	Qualifier
Bromochloromethane	
1,4-Difluorobenzene	
Chlorobenzene-d5	

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 9
HOLDING TIMES

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID	Date Collected	Date Received	1st Date Prepared	Max. Holding Time 1	1st Time Held	2nd Date Prepared	Max. Holding Time 2	2nd Time Held	Date Analyzed	Max. Holding Time A	Time Held Anal.	Q
PP02-SG-01-011314	01/13/14	01/17/14	N/A	N/A	N/A	N/A	N/A	N/A	02/06/14	30	24	
PP02-IA-01-011314	01/13/14	01/17/14	N/A	N/A	N/A	N/A	N/A	N/A	02/06/14	30	24	
PP02-IA-01-011314-FD	01/13/14	01/17/14	N/A	N/A	N/A	N/A	N/A	N/A	02/06/14	30	24	
PP02-SG-02-011314	01/13/14	01/17/14	N/A	N/A	N/A	N/A	N/A	N/A	02/06/14	30	24	
PP02-AA-01-011314	01/13/14	01/17/14	N/A	N/A	N/A	N/A	N/A	N/A	02/06/14	30	24	

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 10
INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Instrument ID: MSG

Field Sample ID/Std ID/ Blank ID/QC Sample ID	Laboratory File ID	Date Analysis Started	Time Analysis Started	Date Analysis Completed	Time Analysis Completed
LEVEL1	LEVEL1.D	02/04/14	1814	02/04/14	1847
LEVEL2	LEVEL2.D	02/04/14	1942	02/04/14	2015
LEVEL3	LEVEL3.D	02/04/14	2027	02/04/14	2100
LEVEL4	LEVEL4.D	02/04/14	2115	02/04/14	2148
LEVEL5	LEVEL5.D	02/04/14	2159	02/04/14	2232
LEVEL6	LEVEL6.D	02/04/14	2244	02/04/14	2317
LEVEL7	LEVEL7.D	02/04/14	2328	02/05/14	0001
LEVEL8	LEVEL8.D	02/05/14	0012	02/05/14	0045

Comments:

_____

_____

_____

DOD
ORGANIC ANALYSES DATA SHEET 10
INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Instrument ID: MSG

Field Sample ID/Std ID/ Blank ID/QC Sample ID	Laboratory File ID	Date Analysis Started	Time Analysis Started	Date Analysis Completed	Time Analysis Completed
ICV-0205	ICV-0205.D	02/05/14	1632	02/05/14	1705
BS2X0205	BS2X0205.D	02/05/14	1951	02/05/14	2024
XB3-0205	XB3-0205.D	02/05/14	2034	02/05/14	2107
PP02-SG-01-011314	N108501 D	02/06/14	0400	02/06/14	0433
PP02-IA-01-011314	N108502 D	02/06/14	0443	02/06/14	0516
PP02-IA-01-011314-FD	N108503 D	02/06/14	0526	02/06/14	0559
PP02-SG-02-011314	N108504 D	02/06/14	0613	02/06/14	0646
PP02-AA-01-011314	N108505 D	02/06/14	0658	02/06/14	0731

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 11
INSTRUMENT PERFORMANCE CHECK

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Instrument ID: MSG Compound: BFB Injection Date/Time: 02/04/14 1814

Mass	Ion Abundance Criteria	% Relative Abundance		Q
50	15% to 40% of mass 95	0.0		
75	30% to 60% of mass 95	0.0		
95	base peak, 100% relative abundance	100.0		
96	5% to 9% of mass 95	0.0		
173	0% to less than 2% of mass 174	0.0	(0.0)	
174	greater than 50% of mass 95	74.1		
175	5% to 9% of mass 174	0.0	(0.0)	
176	>95%, but <101% of mass 174	71.8	(96.9)	
177	5% to 9% of mass 176	0.0	(0.0)	

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, STANDARDS, BLANKS AND SPIKES:

Field Sample#/Std ID/ Blank ID/QC Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
LEVEL1	LEVEL1	02/04/14	1814
LEVEL2	LEVEL2	02/04/14	1942
LEVEL3	LEVEL3	02/04/14	2027
LEVEL4	LEVEL4	02/04/14	2115
LEVEL5	LEVEL5	02/04/14	2159
LEVEL6	LEVEL6	02/04/14	2244
LEVEL7	LEVEL7	02/04/14	2328
LEVEL8	LEVEL8	02/05/14	0012

DOD
ORGANIC ANALYSES DATA SHEET 11
INSTRUMENT PERFORMANCE CHECK

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Instrument ID: MSG Compound: BFB Injection Date/Time: 02/05/14 1632

Mass	Ion Abundance Criteria	% Relative Abundance		Q
50	15% to 40% of mass 95	0.0		
75	30% to 60% of mass 95	0.0		
95	base peak, 100% relative abundance	100.0		
96	5% to 9% of mass 95	0.0		
173	0% to less than 2% of mass 174	0.0	(0.0)	
174	greater than 50% of mass 95	74.1		
175	5% to 9% of mass 174	0.0	(0.0)	
176	>95%, but <101% of mass 174	70.6	(95.3)	
177	5% to 9% of mass 176	0.0	(0.0)	

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, STANDARDS, BLANKS AND SPIKES:

Field Sample#/Std ID/ Blank ID/QC Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
ICV-0205	ICV-0205	02/05/14	1632
BS2X0205	BS2X0205	02/05/14	1951
XB3-0205	XB3-0205	02/05/14	2034
PP02-SG-01-011314	N108501	02/06/14	0400
PP02-IA-01-011314	N108502	02/06/14	0443
PP02-IA-01-011314-FD	N108503	02/06/14	0526
PP02-SG-02-011314	N108504	02/06/14	0613
PP02-AA-01-011314	N108505	02/06/14	0658

DOD
ORGANIC ANALYSES DATA SHEET APPENDIX A
SURROGATE RESULTS

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Matrix: Air

Field/QC Sample ID	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	Q
BS2X0205	100	111											
XB3-0205	100	78											
PP02-SG-01-011314	102	110											
PP02-IA-01-011314	98	99											
PP02-IA-01-011314-FD	98	108											
PP02-SG-02-011314	102	109											
PP02-AA-01-011314	98	100											

S1: Toluene-d8 70-130
S2: 4-Bromofluorobenzene 70-130

Comments:

DOD
ORGANIC ANALYSES DATA SHEET APPENDIX C
INTERNAL STANDARD AREA AND RT SUMMARY

Analytical Method: TO15 SIM SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Instrument ID: MSG Date Analyzed: 02/04/14 Time Analyzed: 2244

	IS1		IS2		IS3	
	AREA (#)	TIME (#)	AREA (#)	TIME (#)	AREA (#)	TIME (#)
MID POINT ICAL	31760	15.08	188008	16.7	152685	20.97
UPPER LIMIT	44464	15.58	263211	17.2	213759	21.47
LOWER LIMIT	19056	14.58	112805	16.2	91611	20.47
SAMPLE ID						
ICV-0205	32869	15.08	196386	16.7	162645	20.97
BS2X0205	27813	15.08	163913	16.70	137790	20.96
XB3-0205	25688	15.13	148347	16.73	116028	20.99
PP02-SG-01-011314	28450	15.07	178294	16.70	139199	20.96
PP02-IA-01-011314	29991	15.08	181309	16.70	144199	20.97
PP02-IA-01-011314-FD	27981	15.07	173453	16.69	140363	20.96
PP02-SG-02-011314	25444	15.08	160465	16.70	141958	20.96
PP02-AA-01-011314	29669	15.08	176980	16.70	138211	20.97

IS1: Bromochloromethane
IS2: 1,4-Difluorobenzene
IS3: Chlorobenzene-d5
IS4:
IS5:
IS6:

Upper Limit = + 100% of Internal Standard Area
Lower Limit = - 50% of Internal Standard Area

Upper Retention Time Limit = + 0.5 minutes
Lower Retention Time Limit = - 0.5 minutes

Column used to flag values outside of QC limits with an asterisk

Comments:

CH2MHILL
Applied Sciences Laboratory (ASL)

1100 NE Circle Blvd., Suite 300
Corvallis, OR 97330
Tel 541-768-3120 Fax 541-752-0276

DL Study Report

Analytical Method: TO15 SIM
Matrix: Air

Instrument ID: MSG
Concentration Units: PPTV

Analyte	Analysis Date	Amt Spiked	Replicates								Std Dev	DL
			1	2	3	4	5	6	7	8		
Vinyl Chloride	12/02/11	2 00	2 50	2 51	2 51	2 60	2 66	2 68	2 51		0 0783	2 00
Methylene chloride	12/02/11	5 00	6 31	6 78	6 54	9 85	6 98	6 89	6 99	6 63	1 13	4 00
trans-1,2-Dichloroethene	12/02/11	2 00	1 96	1 90	2 16	1 84	1 70	1 98	1 88		0 141	2 00
cis-1,2-Dichloroethene	12/02/11	10 0	11 3	11 5	11 4	11 3	11 5	11 6	8 79	11 3	0 930	4 00
Chloroform	12/02/11	1 00	1 35	1 25	1 21	1 34	1 38	1 22	1 30		0 0673	2 00
1,2-Dichloroethane	12/02/11	1 00	1 22	1 27	1 11	1 14	1 10	1 41	1 10		0 116	2 00
Carbon tetrachloride	12/02/11	1 00	1 22	1 25	1 17	1 48	1 27	1 28	1 13		0 112	2 00
Benzene	12/02/11	1 00	5 85	5 91	5 87	5 84	5 94	5 83	5 90		0 0407	2 00
Trichloroethene (TCE)	12/02/11	1 00	1 32	1 21	1 22	1 40	1 43	1 29	1 55		0 122	2 00
1,1,2-Trichloroethane	12/02/11	2 00	2 18	1 98	2 09	2 03	2 03	2 19	2 11		0 0793	2 00
Tetrachloroethene (PCE)	12/02/11	1 00	1 30	1 26	1 42	1 28	1 23	1 23	1 20		0 0725	2 00
1,1,2,2-Tetrachloroethane	12/02/11	5 00	9 25	9 00	9 10	9 27	9 44	9 48	9 07	9 02	0 186	2 00
Naphthalene	12/02/11	30 0	12 1	10 7	7 58	11 9	8 40	9 24	9 28		1 74	10 0

MDL FORM

EQUIPMENT CERTIFICATIONS

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2556S Lab Sample ID: 6L2556S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0164		J
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2556S Lab Sample ID: 6L2556S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	122	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2635S Lab Sample ID: 6L2635S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 01/01/14

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2635S Lab Sample ID: 6L2635S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 01/01/14

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	101	70-130	
4-Bromofluorobenzene	111	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2655A Lab Sample ID: 6L2655A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0318		J
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2655A Lab Sample ID: 6L2655A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	118	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2709A Lab Sample ID: 6L2709A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0309		J
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2709A Lab Sample ID: 6L2709A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	111	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2717A Lab Sample ID: 6L2717A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/23/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0319		J
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2717A Lab Sample ID: 6L2717A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/23/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	93	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2427A Lab Sample ID: FC2427A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/31/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0226		J
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.00984		J
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0177		J
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0209		J
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2427A Lab Sample ID: FC2427A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/31/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	89	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2437A Lab Sample ID: FC2437A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2437A Lab Sample ID: FC2437A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	97	70-130	
4-Bromofluorobenzene	95	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2451A Lab Sample ID: FC2451A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2451A Lab Sample ID: FC2451A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	97	70-130	
4-Bromofluorobenzene	86	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2457A Lab Sample ID: FC2457A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2457A Lab Sample ID: FC2457A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	90	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2468A Lab Sample ID: FC2468A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.00520	0.0130	0.0260	0.0130		U
Methylene chloride	0.0141	0.0177	0.0353	0.0177		U
trans-1,2-Dichloroethene	0.00810	0.0202	0.0403	0.0202		U
cis-1,2-Dichloroethene	0.0161	0.0202	0.0403	0.0202		U
Chloroform	0.00990	0.0248	0.0497	0.0248		U
1,2-Dichloroethane	0.00820	0.0206	0.0412	0.0206		U
Carbon tetrachloride	0.0128	0.0320	0.0640	0.0320		U
Benzene	0.00650	0.0162	0.0325	0.0162		U
Trichloroethene (TCE)	0.0109	0.0273	0.0546	0.0273		U
1,1,2-Trichloroethane	0.0111	0.0277	0.0555	0.0277		U
Tetrachloroethene (PCE)	0.0138	0.0345	0.0690	0.0345		U
1,1,2,2-Tetrachloroethane	0.0140	0.0349	0.0698	0.0349		U
Naphthalene	0.0533	0.160	0.160	0.160		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2468A Lab Sample ID: FC2468A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: UG/M3 Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	96	70-130	
4-Bromofluorobenzene	87	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2556S Lab Sample ID: 6L2556S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.00237		J
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2556S Lab Sample ID: 6L2556S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	122	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2635S Lab Sample ID: 6L2635S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 01/01/14

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2635S Lab Sample ID: 6L2635S Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 01/01/14

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	101	70-130	
4-Bromofluorobenzene	111	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2655A Lab Sample ID: 6L2655A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.00979		J
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2655A Lab Sample ID: 6L2655A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	100	70-130	
4-Bromofluorobenzene	118	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2709A Lab Sample ID: 6L2709A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.00951		J
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2709A Lab Sample ID: 6L2709A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/21/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	111	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2717A Lab Sample ID: 6L2717A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/23/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.00982		J
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: 6L2717A Lab Sample ID: 6L2717A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/23/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	93	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2427A Lab Sample ID: FC2427A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/31/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.00639		J
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.00239		J
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.00324		J
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.003		J
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2427A Lab Sample ID: FC2427A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/31/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	89	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2437A Lab Sample ID: FC2437A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2437A Lab Sample ID: FC2437A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	97	70-130	
4-Bromofluorobenzene	95	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2451A Lab Sample ID: FC2451A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2451A Lab Sample ID: FC2451A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	97	70-130	
4-Bromofluorobenzene	86	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2457A Lab Sample ID: FC2457A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2457A Lab Sample ID: FC2457A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/24/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	98	70-130	
4-Bromofluorobenzene	90	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2468A Lab Sample ID: FC2468A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier
Vinyl Chloride	0.002	0.005	0.010	0.005		U
Methylene chloride	0.004	0.005	0.010	0.005		U
trans-1,2-Dichloroethene	0.002	0.005	0.010	0.005		U
cis-1,2-Dichloroethene	0.004	0.005	0.010	0.005		U
Chloroform	0.002	0.005	0.010	0.005		U
1,2-Dichloroethane	0.002	0.005	0.010	0.005		U
Carbon tetrachloride	0.002	0.005	0.010	0.005		U
Benzene	0.002	0.005	0.010	0.005		U
Trichloroethene (TCE)	0.002	0.005	0.010	0.005		U
1,1,2-Trichloroethane	0.002	0.005	0.010	0.005		U
Tetrachloroethene (PCE)	0.002	0.005	0.010	0.005		U
1,1,2,2-Tetrachloroethane	0.002	0.005	0.010	0.005		U
Naphthalene	0.010	0.030	0.030	0.030		U

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

DOD
ORGANIC ANALYSES DATA SHEET 2
RESULTS

Analytical Method: TO15 SIM Preparatory Method: NONE SDG #: N1085

Lab Name: CH2M HILL ASL Contract #: N/A

Field Sample ID: FC2468A Lab Sample ID: FC2468A Matrix: AIR

% Solids: 0

Date Received: Date Extracted: Date Analyzed: 12/26/13

Concentration Units: PPBV Dilution: 1

Analyte	DL	LOD	LOQ	Result	Confirm.	Qualifier

Surrogate	Recovery	Control Limits	Qualifier
Toluene-d8	96	70-130	
4-Bromofluorobenzene	87	70-130	

Internal Standard	Qualifier
Bromochloromethane	

Surrogate Recoveries are reported in Appendix O-A
Internal Standards are reported in Appendix O-C

Comments:

CHAIN OF CUSTODY/SHIPPING DOCUMENTS

CH2MHILL
Applied Sciences Laboratory (ASL)

Suite 300
Corvallis, OR 9733..
Tel 541.768.3120
email: ...
www.ch2mhgb.com

CHAIN OF CUSTODY RECORD

Project # or Purchase Order # 459603.01.VI.RS.01 and 459603.01 VI.RS.02	
Company Name CH2M HILL	
Project manager or Contact & Phone # Tony Swierczek/314.336.3043	**Report Copy to:** Shane Lowe
Turnaround Time ☐24 hours ☐48 hours ☐72 hours ☐7 days ☐14 days ☒21 days	**Drinking Water?** Yes ☐ No ☒ **Sample Disposal:** Dispose ☒ Return ☐

Sampling		Type		Matrix				TOTAL # OF CONTAINERS	Requested Analytical Method										THIS AREA FOR LAB USE ONLY
Date	Time	COMP	GRAB	WATER	SOIL	AIR	CLIENT SAMPLE ID		Benzene, Carbon tetrachloride, Chloroform, 1,2-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, Methylene chloride, Naphthalene, 1,1,2,2-TeCA, 1,1,2-trichloroethane, PCE, TCE, Vinyl chloride										
									Preservative										
									UNPRES										EPA Tier QC Level 1 (Screening) 2 3 4
																			Alternate Description
01/13/14	1056					X	PP03-SG-01-011314	1	X										1
01/13/14	1057					X	PP03-IA-01-011314	1	X										2
01/13/14	1100					X	PP03-AA-01-011314	1	X										3
01/13/14	1225					X	PP02-SG-01-011314	1	X										4
01/13/14	1230					X	PP02-IA-01-011314	1	X										5
01/13/14	1231					X	PP02-IA-01-011314-FD	1	X										
01/13/14	1233					X	PP02-SG-02-011314	1	X										
01/13/13	1237					X	PP02-AA-01-011314	1	X										

CT 206 1/20/14
N1085

CT 2060 1-21-14

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Volatile Contaminants/Odorous ☐ Biohazard ☐ Other _____

Sampled By and Title		**Date/Time**	
Anthony Swierczek		01/14/14	1600
Received By	**(Please sign and print name)**	**Date/Time**	
Clara Tiemann	Clara Tiemann	1/17/14	1200
Received By	**(Please sign and print name)**	**Date/Time**	

Relinquished By	**(Please sign and print name)**	**Date/Time**	
Anthony Swierczek		01/14/14	1700
Relinquished By	**(Please sign and print name)**	**Date/Time**	

Shipped Via **Tracking #**

UPS FedEx Other _____

Special Instructions

tracking # 7976 3812 1003

DOC CONTROL ID: ASL783-0911

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Record

SDG ID: N1085 Date Received: 1/17/14

Client/Project: St Louis Ordnance Checked By: CT

Packing Material: Ice Blue Ice ~~Box~~ Bubble Wrap HD (circle all that apply) Checked By: _____

Shipping ID: _____ -- or -- On File COC HD USPS (circle one)

VERIFICATION OF SAMPLE CONDITIONS (verify all items), HD = Client Hand delivered Samples	NA	YES	NO
Were custody seals intact and on the outside of the cooler?		x	
Radiological Screening for DoD	x		
Temp OK? (<6C) Therm ID TH173 Exp. 3/14 20.3 °C		x	
Was a Chain of Custody (CoC) Provided?		x	
Was the CoC correctly filled out (If No, document in the SRER)		x	
Did sample labels agree with COC? No, document in SRER		x	
Did the CoC list a correct bottle count and the preservative types (Y=OK, N=Corrected on CoC)		x	
Were the sample containers in good condition (broken or leaking)?		x	
Was enough sample volume provided for analysis? No, document in SRER	x		
Containers supplied by ASL?		x	
Any sample with < 1/2 holding time remaining? If so contact LPM			x
Samples have multi-phase? If yes, document on SRER			x
All VOCs free of air bubbles? No, document on SRER	x		
pH of all samples met criteria on receipt? If "No", preserve and document below or on SRER	x		
Dissolved/Soluble metals filtered in the field?	x		
Dissolved/Soluble metals have sediment in bottom of container? Document in SRER	x		

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials

CH2MHILL
Applied Sciences Laboratory (ASL)

Sample Receipt Exception Report

Sample Batch Number: N1085 **Client/Project** St Louis Ordinance

The following exceptions were noted:

		Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by project	COC split into two SDGs, though only one COC provided. N1077: Samples 1 -> 3 N1085: Samples 4 -> 8
	2. No chain-of-custody provided	COC does not include the equiptment ID
	3. Analysis, description, date of collection not provided	
	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested	
	6. Container inappropriate for analysis requested	
	7. Inadequate sample volume.	
	8. Preservation inappropriate for analysis requested	
	9. Samples received out of holding time for analysis requested	
	10. Discrepancies between COC form and container labels.	
xx	11. Other.	

ACTION TAKEN:

Originator: Clara Thomann Date: 1/20/2014

Client was notified on: (Date/Time) Client Contact:

Client Services: